Smithsonian

October 1990

Creepy creatures from the masters of make-believe (p. 112)

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Smithsonian

Volume 21, Number 7

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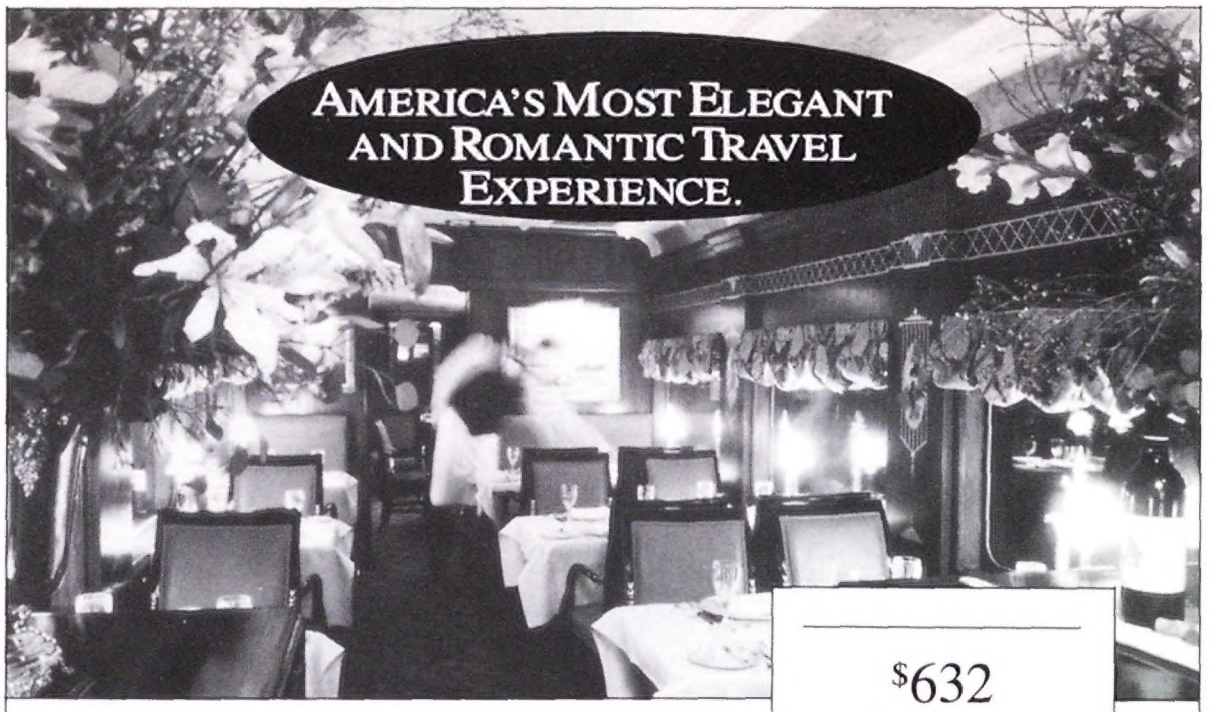

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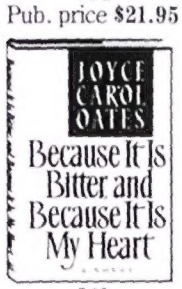

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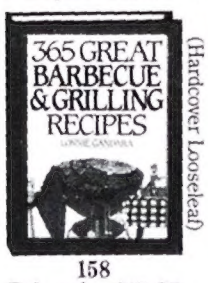

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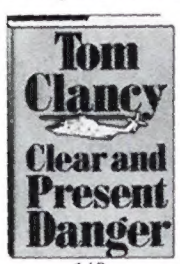

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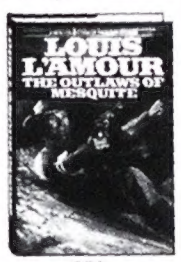

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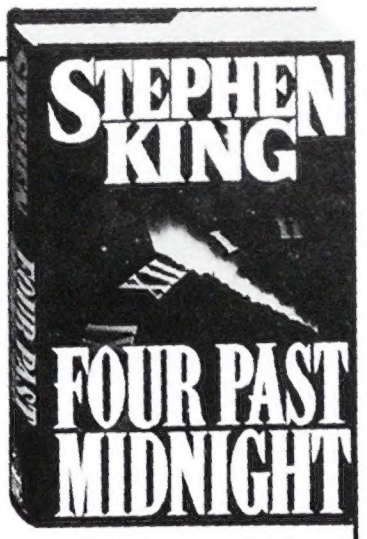
All in all, for King fans, *Four Past Midnight* is like having your wildest nightmares come true.



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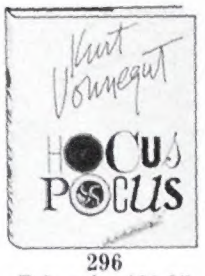

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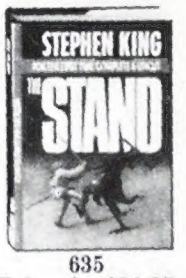

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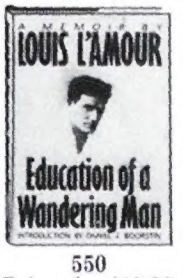

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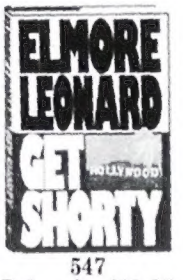

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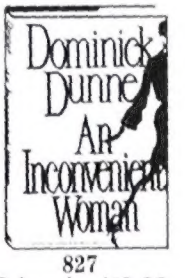

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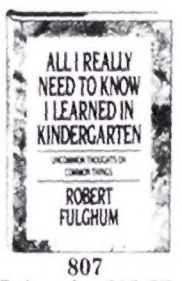

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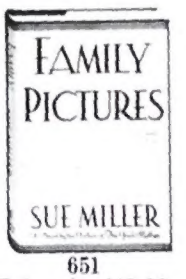

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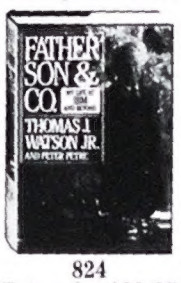

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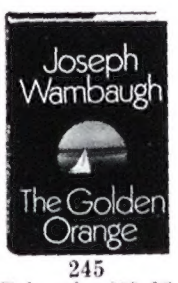

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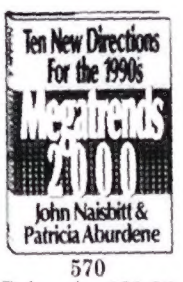

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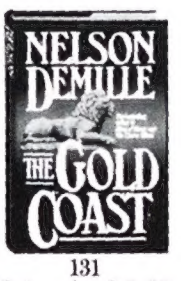

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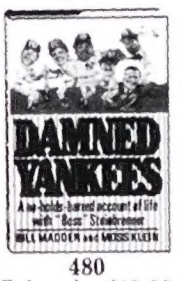

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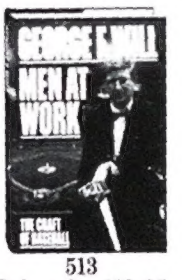

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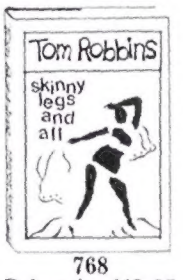

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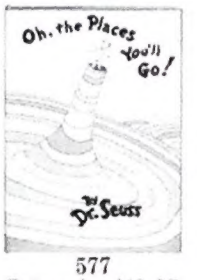

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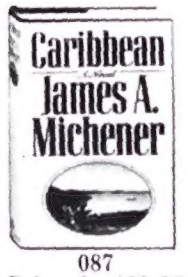

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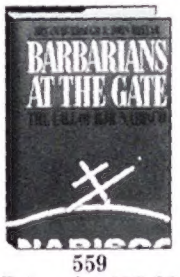

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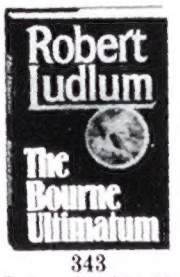

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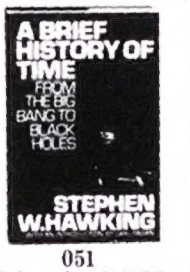

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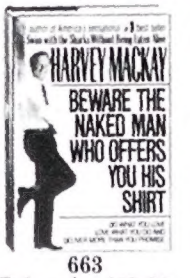

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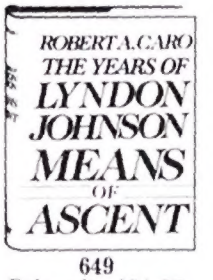

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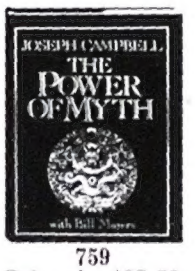

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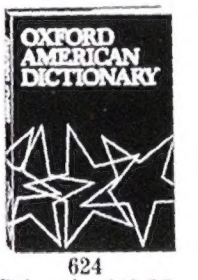

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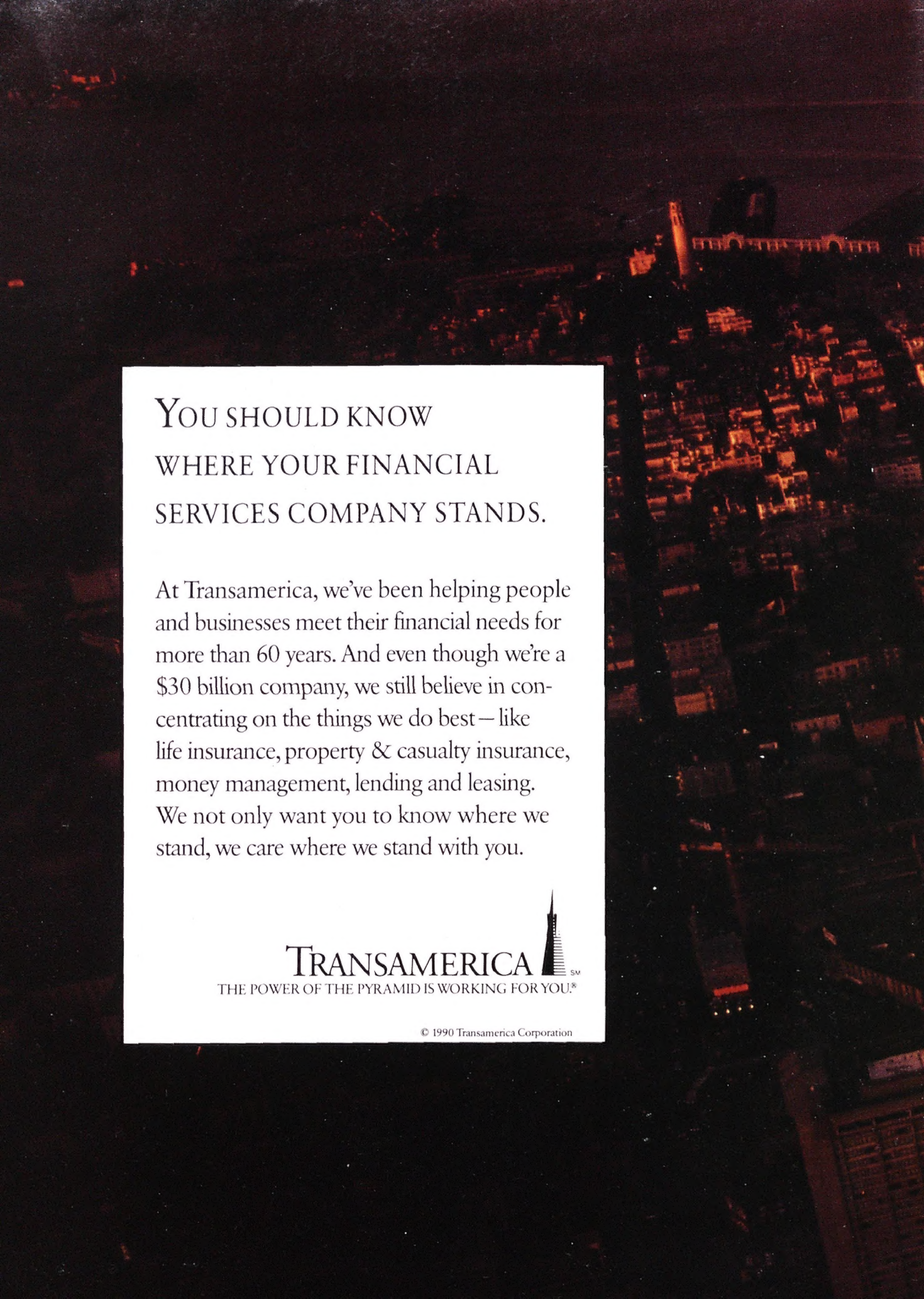

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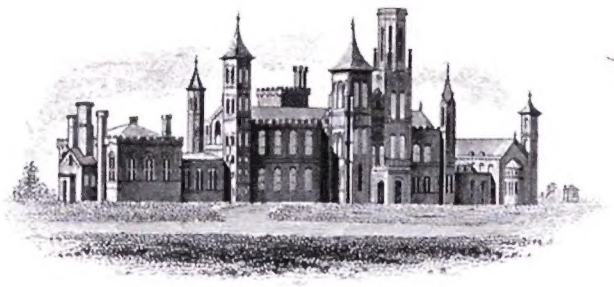


Smithsonian horizons

Steps are under way to restore the American Indian's cultural patrimony, a complex and long-overdue process

The legislation authorizing construction of the new National Museum of the American Indian contains important provisions for the repatriation of native American human remains and associated artifacts. While these provisions unquestionably represent a loss to science, they had long been sought by the individuals and communities involved and were widely welcomed by the American public. There are some difficult and lengthy problems of documentation to be overcome, but our curators are complying with this responsibility.

The elementary, overriding right of Indians to make their own provisions for the reinterment of their ancestors in museum collections cannot seriously be questioned. It forms, after all, the root of one of the West's great tragedies, *Antigone.* As the philosopher Vico long ago observed, societies "all have some religion, all contract solemn marriages, all bury their dead." Making the case for repatriation especially poignant is the fact that, while many of the remains in our collections were obtained in salvage excavations mandated by law, in earlier years others were carried away from frontier battlefields or illegally sequestered from the cemeteries of living communities.

Still awaiting resolution are further, less clear-cut, issues of cultural patrimony. Many of them turn on distinctions between individual property, which could have been legitimately given or sold to non-Indian collectors, and objects playing a part in the political or spiritual life of the community. It can be persuasively argued that the latter objects could not rightfully have been transferred by the act of any individual, even while he or she was (temporarily) invested with the authority of an office.

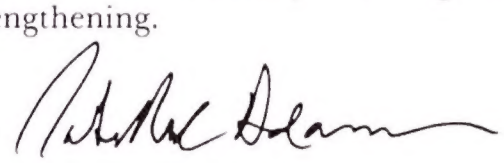
Documentation is often lacking, of course, on the transactions by which many objects in museum collections were originally acquired from tribal peoples. Many may have passed through one or more private collections on the way into institutional hands. Probably it can be assumed that scholars have been relatively more punctilious than lay persons about acts of transfer in which they participated, both because of their obligation to keep records and because a description of the circumstances frequently has a bearing on the interpretation of the object itself. At least in the case of two Zuni war gods that the Smithsonian returned to the New Mexican Pueblo several years ago, however, we did it after determining that the original acquisition in the late 19th century had been flawed.

Compounding the problem is the very strong likelihood of conflicting perceptions. What buyers or gift-receivers (who, after all, had a personal interest in the matter) may have interpreted as freely negotiated transfers did not necessarily appear so to recently subjugated people dependent on official largess. Reciprocal "gifts" of alcohol, trinkets or desperately needed firearms sometimes played a part. Exchange and, more particularly, sale were not ceremonies that were necessarily endowed with equivalent finality and lack of ambiguity by both parties. While enshrined in modern American law and life, the institution of the market had no real functional equivalent in many aboriginal societies.

Again this issue can have a special poignancy, as tribal petitions sometimes testify. Most ways of life are anchored in a collective respect for traditions. Those traditions need to be periodically reaffirmed in ceremonies and communicated to successive generations, and to this end they are usually symbolically expressed in objects that often assume a sacred character. What can it mean to tribes defending their place in the harsh flux of contemporary political and economic life to be able to view some of the greatest symbols of their past autonomy and vitality only in glass cases in museums? Indian traditionalists, committed to inculcating the sacred values of their own people, may or may not find open advocacy of those values possible in the court of American public opinion. But without access to symbols of continuity their contributions to tribal life can be seriously compromised.

Richard West, who was appointed earlier this year as the new Indian Museum's founding director, faces the need to develop a position on these questions as we begin to plan for the transfer of the bulk of the Heye Foundation collection from New York City to Washington. So also does Tom Freudenheim, Assistant Secretary with responsibility for all of the Smithsonian's museums, because the issues that have now arisen with American Indians obviously have wider, international applications. With the two of them, I participated in a daylong meeting in the Indian Pueblo Cultural Center in Albuquerque last August, affording an opportunity for us to hear from a number of Indian and museum spokespersons representing many viewpoints.

Further legislation is pending in this area that may affect all U.S. museums, so that detailed comments on the outcome are probably inappropriate. But some basic principles will serve the Smithsonian well, irrespective of any legal requirement: we need to recognize American Indians not primarily as the involuntary, deceased suppliers of some of our greatest collections, but as a living, growing part of the culturally diverse streams the Smithsonian exists to serve. And we can best serve the Indians by actively seeking out ways to make available our material and human resources for community building and strengthening.



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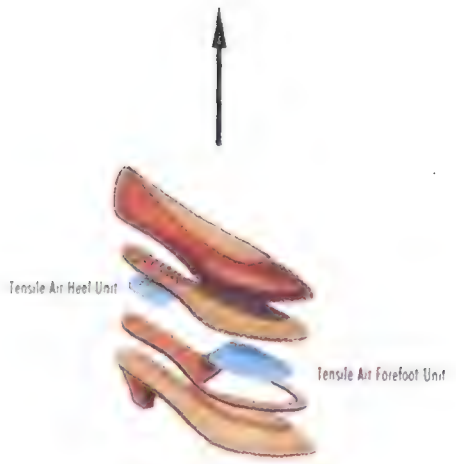

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Letters to the Editor

Anatolian dam project

Dear Sir: I spent three months in Turkey in 1957 as an adviser to Elektric Isleri Etut Idaresi, the electric planning bureau. I am amazed at the construction progress since then, as reported in your August issue, and happy to learn that many old treasures are being saved.

Yes, at times sole access along the Tigris was by boat. When I landed at Diyarbakir, I found two rafts supported by inflated goatskins being loaded with steel pipe for transport to a town some four days' travel downstream. Each raft was 10 goats wide by 14 goats long. Later I read of a Greek army, foiled in an attempt to overthrow the Persian king, that made its way north to Samsun, crossing the Tigris at Diyarbakir on goatskin rafts in 400 B.C. It takes a good idea to be effective for 2,357 years!

Kenneth N. Phillips
Portland, Oregon

Summer camps

Dear Sir: Daniel Cohen brought back poignant memories of my performing-arts experiences at Camp Louise as a child. I have been grateful ever since to director Ida Sharagrodsky for providing culturally rewarding summers.

I was introduced to modern dance and to George Gershwin when Ethel Mann, a student of Doris Humphrey and Charles Weidman, danced to *Rhapsody in Blue* in the moonlight, accompanied by a phonograph record. And to Edna St. Vincent Millay, when drama counselor Helen Kuhnberg read "Renascence" to us in the hush of twilight.

We walked and danced in our bare feet for miles on the railroad ties with Minna Cantor, the Isadora Duncan-trained dance teacher.

We tiptoed out of our bunks in the dark along with counselor Judy Fralekoff, and climbed the mountain to have the sunrise to ourselves while the rest of the world slept.

I also learned to swim, made little gifts in arts and crafts, and played volleyball. I even found time for jacks on the front porch or for a leisurely swing on the old-fashioned iron fire gong before dinner.

My experiences at Camp Louise opened my eyes and ears, and developed my senses. Its strong early influence played a significant role in my becoming a choreographer, musician and playwright.

Flora B. Atkin
Chevy Chase, Maryland

Dear Sir: In late 1959 my parents, my twin brother and I immigrated to the United States. Laszlo and I were not quite 11 when we arrived in New York City. We spoke no English. Among many other things American, we had never seen, much less played, baseball, football or basketball; had never chewed gum, eaten a hot dog, danced the twist or watched TV. We had a lot of catching up to do.

The following summer my parents sent us to the Jewish Community Camp in Hurley, New York. Our camp counselors quickly figured out the problem and put my brother and me in separate groups. We barely saw each other. Consequently, by summer's end we both spoke nearly fluent, if still heavily accented, English. In fact, I recall helping to make up bawdy and irreverent verses to songs we sang on the bus to camp every day. By the end of camp we felt quite at home, and thoroughly familiar with most things American.

I'm convinced I learned more about myself and my new country in those two months than I did in years of school.

Sandor Slomovits
Ann Arbor, Michigan

Dear Sir: Not only did Frederick William Gunn establish summer camps in the United States, he also established, in 1850, a boarding school in Washington, Connecticut, still known as the Gunnery.

We are a small coeducational prep school of about 225 students. Our oldest tradition is the School Walk, going back to the trek Mr. Gunn made to Long

Island Sound in 1861. Every fall around the time of Mr. Gunn's birthday the headmaster declares a holiday, and the entire school hikes to Mt. Tom in Bantam, has a picnic lunch and hikes back to school. It is an experience that underclassmen grumble about, seniors get nostalgic about, and alumni usually recall fondly.

John D. Herrick
Assistant Headmaster, the Gunnery
Washington, Connecticut

Smithsonian horizons

Dear Sir: The NEA funding controversy is by no means the first rough spot in America's uneasy relationship with art and artists. One could cite Philadelphia's withdrawal from exhibition of John Vanderlyn's nude *Ariadne* (1819), the "editing" of the more "modern" pieces from the Armory Show during its Boston appearance (1913), or the ridicule aimed at much abstract art since the Second World War.

The present debate threatens to impose Congressionally mandated curbs on artistic expression by denying funding to artists whose points of view might not agree with that held by some segment of the public—who are by no means obligated to attend any exhibition. Such action would constitute censorship and would be a clear violation of the intent of the First Amendment.

Anyone who would seek to curb or control creativity is due to fail. Congress and any other interested parties should recall Vasily Kandinsky's 1910 words in *Concerning the Spiritual in Art*: "There is no 'must' in art, which is forever free. Art flees before the word 'must' as day flees from night."

Richard L. Brown
Tacoma, Washington

Dear Sir: Taxpayers will likely not be bothered by experiments in science that present a controversial aspect, or even science research projects that go awry. The continued search for "proof" will eventually liberate "truth." No such vindication will or can occur in art. Art will stand or fall by public enlightened or unenlightened opinion. Thank God, we do have a right in America, and a penchant, for raising cain over art that offends, insults, discredits, denigrates and irritates. We will lose our right to be free people if we don't.

If we are to support the National Endowment for the Arts, even with the price of a cup of coffee, we must expect accountability as to the judgment by which it arranges and funds museums and galleries operating under its auspices. We must also expect the works displayed to be representative of the artistic values of our time. Let us leave the avant-garde outside the government umbrella, because that is where they will strive the hardest to be creative, provocative and finally productive. Thus, their First Amendment rights will also be protected.

Rev. Magnus Egge
San Clemente, California

Dear Sir: You say that public support of science requires an unprecedented tolerance for fairly high levels of uncertainty, controversy and public dissent. As one who has spent most of his life as a professional artist and art teacher, I believe this is also true of the arts. Nevertheless, this does not excuse the abuse of esthetic standards and criteria. Some works of art are difficult, but during the past decade or two, the public has become more sophisticated than were their forefathers. We understand that Jasper Johns, in using the American flag in a modernist painting, is not insulting patriots, but an artist who portrays an American flag on the floor of an art gallery so it will be trampled underfoot *is* insulting patriots.

Whim has displaced standards in exhibits of contemporary art, and it is contemporary moral values, not just traditional values, that are being trampled underfoot.

The American people, according to surveys, are willing to see their tax dollars spent to support the arts, but they are wary of being ripped off by frauds and con artists.

David L. Smith
Dayton, Ohio

Dear Sir: Thomas Jefferson, not the Jesse Helms of his day or any other, once wrote that "to compel a man to furnish contributions of money for the propagation of opinions which he disbelieves is sinful and tyrannical."

Saul David
Van Nuys, California

Hugo Gernsback

Dear Sir: Representing an engineering company working on a searchlight project at Fort Belvoir in early 1942, I saw a device being tested that looked like

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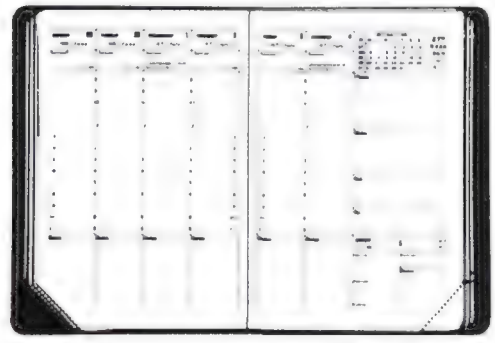

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a Gernsback design. I was told by the "90-day wonder" in charge that it was a top-secret portable mine detector. I couldn't stop laughing. "Top secret? Hugo Gernsback had an article on it in his *Radio News* 20 years ago." The major didn't believe me and had someone search the library files. Sure enough, there it was. So much for top secret.
Joseph Weinberg
Boonton, New Jersey

Dear Sir: I received an early education in electronics and radio directly from Hugo Gernsback's *Radio News* and *Radio-Craft* magazines, along with other booklets he published. They provided me with sufficient knowledge to own and operate, in my early teens, a radio and appliance repair service.
Albert Levitt
Delray Beach, Florida

Dear Sir: Your article brought to mind the most unpromising invention ever reported in a Gernsback publication. "The smell organ," described in the June 1922 issue of *Science and Invention*, was an adaptation of the standard organ keyboard. Each key yielded an odor ranging from patchouli to civet; 47 distinctive scents wafted over the audience in combinations and amounts controlled by the organist. The author explained: "These odors have been discovered and placed in their particular locations after painstaking research, . . . being arranged in bottles and sprayed up into the air by an atomizer-like action."
Charles F. Denny
Redding, California

Dear Sir: I was one of many who, as a boy, read *Amazing Stories* and its successors from the very first issue in 1926, standing first on one foot and then on the other in the corner drugstore because I hadn't the money to pay for them.

In 1930 *Wonder Stories* crushed me with a rejection slip that read "Science illogical and incorrect." Fortunately, it didn't discourage me, for I went on to pour forth hundreds of thousands of words for *Amazing Stories* (then under the editorship of Ray Palmer), *Fantastic Adventures*, *Imagination* and the like.
Dwight V. Swain
Norman, Oklahoma

Tomatoes

Dear Sir: As author of several articles on tomato history, I take exception to several statements in Thomas Wolf's article. Thomas Jefferson was not the first to cite the tomato in America. That honor goes to William Salmon, an English herbalist who reported in 1710 that he saw tomatoes growing in Carolina.

The New Art of Cookery does include a recipe with "love apples" as an optional ingredient "to dress haddock the Spanish way." Also, it was not the first cookbook published in America. British cookbooks were published here beginning in 1742.

The story about Robert Gibbon Johnson having proved the tomato was safe first appeared 104 years after the purported date of the event; it was never substantiated. Wolf's version was the fanciful creation of Joseph Sickler in 1948.

Tomatoes were an established garden vegetable and cookery ingredient in the Southern and Middle Atlantic states well before 1820. Jefferson reported that tomatoes were sold by vendors in Washington, D.C. while he was Presi-

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dent. Several tomato recipes had been published in America; one for tomato catsup is in James Mease's *Archives of Useful Knowledge* (Philadelphia, 1812).
Andrew F. Smith
Brooklyn, New York

Edwards Deming

Dear Sir: Your image of Ed Deming skipping down the hall with two women brings to mind Apollo dancing with the Muses on Parnassus.
Mary Ann Devine
Tarzana, California

Dear Sir: I attended a course in population sampling that W. Edwards Deming gave at New York University graduate school in 1947 or '48. He was a very thorough instructor—so much so that he managed to cover only part of the course content in the allotted semester.

One point he frequently came back to, and which impressed me greatly, was that any attempt to conduct a complete census was likely to yield results far less reliable than those obtained from a well-designed sampling. A sampling would require a much smaller work force, allowing for far better training and tighter supervision. The gain in quality would more than offset the random sampling error introduced by the sampling process.

The widely publicized problems of the 1990 U.S. census reminded me that more than 40 years ago Deming was a consultant to the Bureau of the Census. Perhaps they should have retained him.
Thomas Semon
Demarest, New Jersey

Missionaries

Dear Sir: This is a fascinating story of the commitment and dedication of those who found expression of their faith in missionary adventure. In today's culture we need to be reminded of the ordeals these sturdy people experienced.
William J. Reynolds
Fort Worth, Texas

Dear Sir: This article exemplifies the presumptive naiveté of missionary faiths, especially when applied to India. To no Indian should it come as a surprise that the missionary zeal of Jane and Ferdinand Ward, however sincere, had virtually little or no success in India. For hundreds of years India has been visited, invaded, plundered, lived in and studied by diverse faiths; vilified, ridiculed and misunderstood countless numbers of times. Yet the core of its spirituality—timeless, universal and all-embracing—has remained unshaken.

The author uses the expression "the stubborn immutability of India" to describe the lack of missionary success. The spiritual India is indeed immutable—as is truth itself. India's lofty spiritual heritage, reflected in its spiritual literature, has deeply influenced the very best of Western minds—Schopenhauer, Max Mueller, Emerson, Thoreau, Whitman and Romain Rolland, to name only a few. It continues to do so.
Monish R. Chatterjee
Binghamton, New York

Dear Sir: Ferdinand and Jane Ward were among the shipmates of my great-grandparents, Edward and Emily Cope, on their long voyage aboard the *Saracen*.

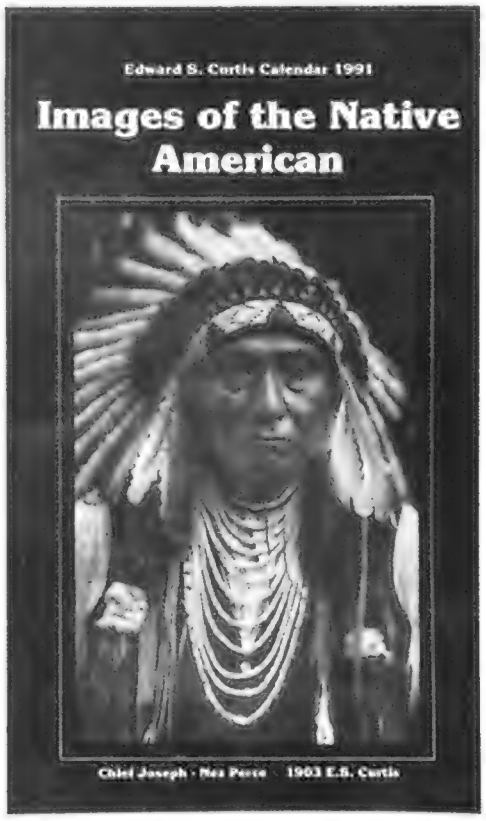
Countless hours have been spent by members of my family transcribing letters from the Wards, among many others, and journals documenting the Copes' often-rigorous experiences, first in the Madura mission, then at the associated mission in Jaffna, Ceylon. Edward's work while in charge of the Batticotta Seminary was a great satisfaction to him, but eventually his health failed, making the Copes reluctantly abandon the endeavor to which they had hoped to devote their whole lives.
Dorothy C. Howard
Gilbertsville, New York

Object at hand

Dear Sir: Although Edward III's claim to the French throne was definitely tenuous, it was stronger than just being descended from Eleanor of Aquitaine. His legal justification stemmed not from his great-great-great-grandmother, but from his own mother, Isabella, daughter of King Philip of France. He was that monarch's only grandson. All three of Philip's sons reigned, and each had only daughters. After a French court ruled that because of the Salic Law the throne could not descend through a woman, the son of Philip's younger brother became king.

Edward III's queen, Philippa of Hainaut, is usually given credit for saving the six burghers of Calais. Pregnant with one of Edward's many children, she got down on her knees to plead for the lives of the condemned. It is said that he could not resist her.
Toby Friedenberg
Lenox, Maryland

Edward S. Curtis Calendar 1991



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Chief Joseph
Nez Percé 1903

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Around the Mall and beyond

Mary Alice whispers sweet nothings to National Zoo director Michael Robinson.

Everyone knows that a cheetah can run faster than the speed limit on the Interstate. Not so many people know that this leopardlike animal is really a different breed of cat, with a genus all to itself: *Acinonyx*; or that there's only one species, *jubatus*; or that the various subspecies, based on the regions of occurrence, are so much alike that you might as well forget them. Whether it hails from the blistering hot Atlantic shore of Senegal or from Kruger National Park, 4,250 air miles away, a cheetah is simply a cheetah.

That genetic homogeneity is a big reason why this, the world's most fleet-footed land mammal, is also one of its most endangered creatures. It was to learn more about cheetahs that I dropped in at the Smithsonian's National Zoo recently. But first, I got a tiger by the tail.

It was, fortunately, a very small tiger—2 months old. It was the only living tiger cub in the world to have been born from in vitro fertilization. It had been conceived in a laboratory petri dish when eggs from two female tigers were formally introduced to sperm from a male named Chester, and they got along OK. The tiny embryos were then put inside Nicole, a 9½-year-old female tiger who, with a little help from some hormone shots, accepted her role of surrogate.

Nicole gave birth to three cubs by Caesarean section. One died immediately. Another succumbed to pneumonia at 3 weeks—nothing to do with its conception. That makes the third cub, Mary Alice, the first-ever surviving test-tube tiger. She holds the door ajar for future generations of tigers and other cats to be born in zoos. In fact, for every animal facing extinction's one-way tunnel, Mary Alice offers a glimmer of hope.

All this heavy breathing has little effect on Mary Alice. When I saw her, she was an appealing tyke, the size of a beagle but with huge paws. Since humans have always filled a big slice of her environment, she fully accepts them. Yet she's got a firm sense of independence.

"Want to hold her?" someone asked when I joined her fan club outside the Zoo's new veterinary hospital. I guessed I did. So there I was with one hand under Mary Alice's foreleg and one under her tail, and for a moment she leaned against my shoulder like a furry grandchild. But quite soon she had had enough of it and pushed strongly away, bleating like a goat. Small grandchildren often act exactly the same way, and I know when to relinquish them to the generation in between.

Back on the ground, the little tiger stalked through the grass, sidled over to a wooded hillside and set out to explore the delicious world. Ann Donoghue spotted her in time and scooped her up.

Ann and Leslie Johnston are researchers on the team that's been working on this breeding technique. Scientists from the Minnesota Zoological Gardens and the Henry Doorly Zoo in Omaha (where Mary Alice was born) cooperated with our National Zoo people in the long process that led to the cub's birth. Years of studying and cataloguing the genetic make-up of zoo animals gave

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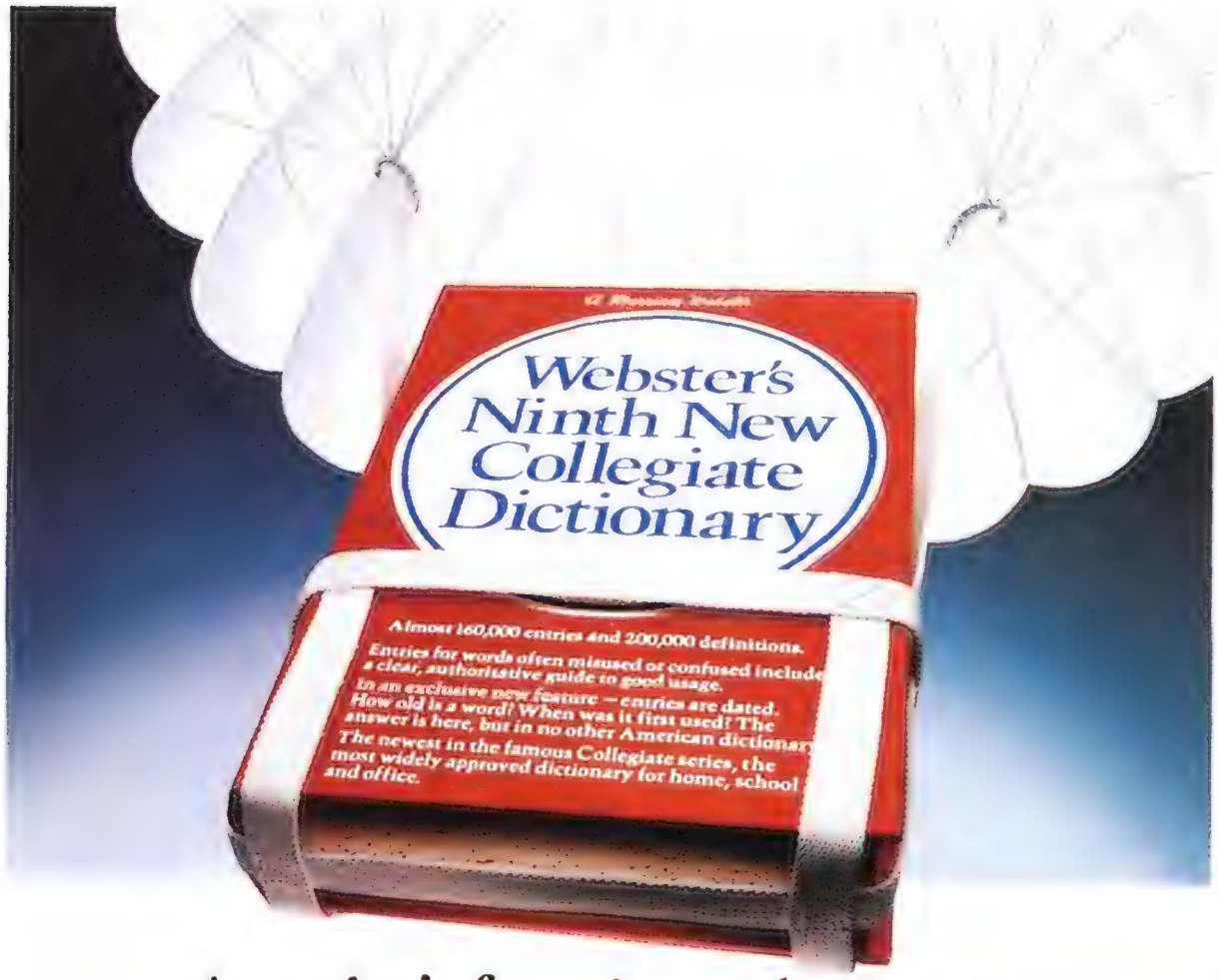
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the team guidelines for choosing parents.

Dr. David Wildt, chief reproductive physiologist at our zoo, and his former graduate student Dr. Karen Goodrowe tried for three years to get live-born offspring from in vitro fertilization (IVF) of domestic cats. They succeeded in 1987. IVF is preferable to artificial insemination for several reasons, chiefly because more offspring can be produced as embryos are placed in several surrogate mothers. Also, if a pregnancy doesn't occur, it is much easier to determine what went wrong.

Ann and Leslie adapted the domestic cat procedures for the selected tiger-egg donors and the surrogate mother. If you want to try, here's how: you stimulate follicle growth (follicles contain the eggs) with two hormone injections. Then you slip a fiber-optic telescope through a small incision in the egg donor (incidentally, you'd better anesthetize her first) so you can see the follicles on the ovaries. You get the microscopic eggs by putting a needle into the follicles and very carefully—and hopefully—sucking them into a slim plastic tube attached to a test tube. The eggs go into that petri dish to mix with sperm, which you've previously washed and processed, and the dish is incubated. After 30 hours you look for those embryos—still microscopic—that have divided and hence are fertile. They go into the surrogate's reproductive tract.

Ann Donoghue says that the use of a mobile lab was a sound contribution. She and Leslie worked out ways of reducing the bulk of such delicate equipment as the incubator. They made it portable. They could pack the lab into boxes, load the boxes onto a plane and head for a distant city. They could take the lab to the animal, a much easier process than taking the animal to the lab. Embryo transfer depends, among other things, on exact timing. The mobile lab made that feasible and has helped speed up the attempts at IVF at the three zoos.

One thing that's kept the number of births down is genetic health. When there's little difference between the genetic makeup of animals, they become inbred. Their young don't live very long—often don't even make it to birth. Those highly homogeneous cheetahs are a perfect example. Laurie Marker-Kraus, a tallish, friendly, thirtysomething woman from Oregon, directs a National Zoo program called New Op-

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portunities in Animal Health Sciences (NOAHS), which funds research on genetics and reproduction of endangered species. OK, it's a pretty contrived acronym—but it's a handy tag for the work done by Miller, Johnston, Wildt, the National Zoo's chief veterinarian Mitchell Bush, geneticist Stephen O'Brien of the National Cancer Institute, and others.

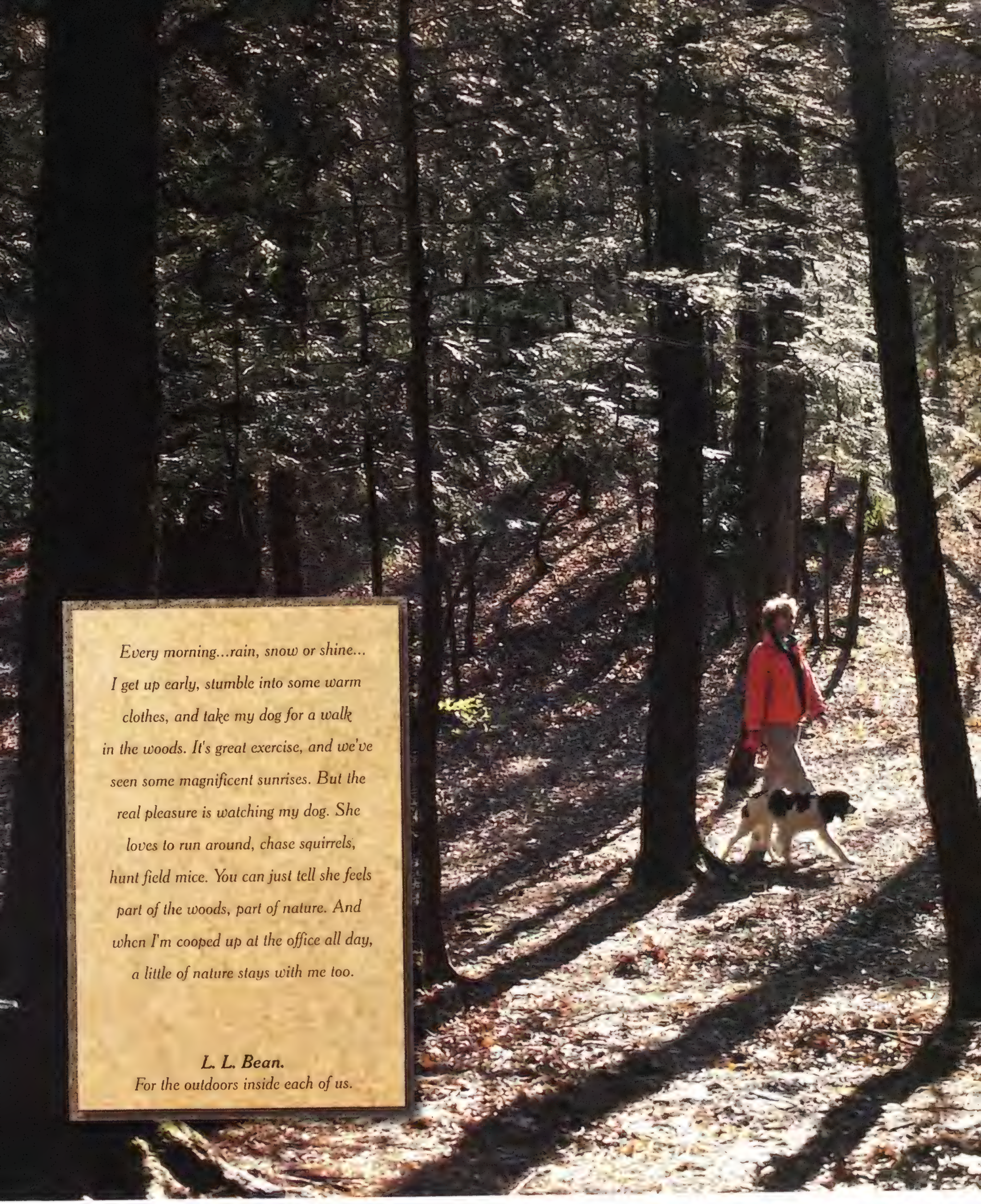
Marker-Kraus is generally recognized as the world's walking encyclopedia of cheetahs. Mention the word to her and she lights up with a jolt of inner voltage. This makes her a gratifying expert for a journalist to interview. By the time I screwed up enough courage to call her by her first name, she was telling me that cheetahs (at about three times their present 100-pound bulk) may have originated in what is now North America; that they once roamed the Earth; that some 10,000 years ago their population crashed; that today's cheetahs descend from the survivors of that population bottleneck.

Wild cheetahs now number maybe 15,000, but they're split into small geographic cells, 100 here, 400 there. That's why they lack genetic variety.

"Blame people like Akbar the Great for a lot of the problem," Laurie told me. I was quite willing to, if only I knew who he was. She enlightened me.

"Between the 14th and 16th centuries, cheetahs were used for hunting in Central Asia and India—the way some people still do with falcons. Cheetahs are easy to tame and get along well with humans. Akbar the Great, a Mogul emperor, had 9,000 of them during his reign. But the trouble is, they rarely breed in captivity." So the Asian cheetah is practically gone, and the African is inbreeding. Seemingly this is the perfect opportunity for zoo animals to step into the breach and keep the species alive. But it takes a lot of lab work to find cheetahs that are genetically diverse enough for breeding.

Laurie's giant first step has been to compile the "International Studbook" of *Acinonyx jubatus* and keep it updated. This lists about 800 cheetahs in zoos and captive wildlife parks (I counted 138 such places in my copy) throughout the world. By referring to it, zoo curators and the NOAHS people can identify animals of the right age, health and genetic background to breed. If this program and the new techniques of artificial insemination and IVF can work with



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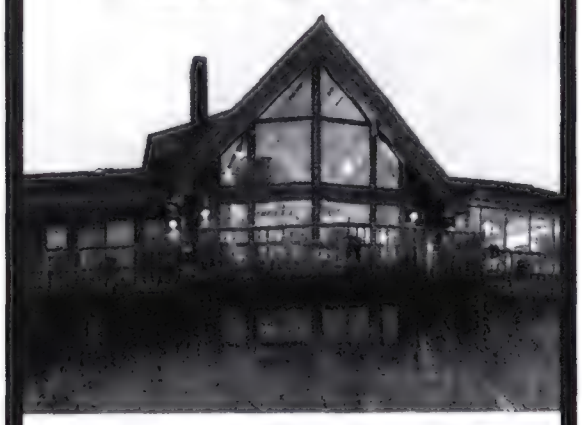

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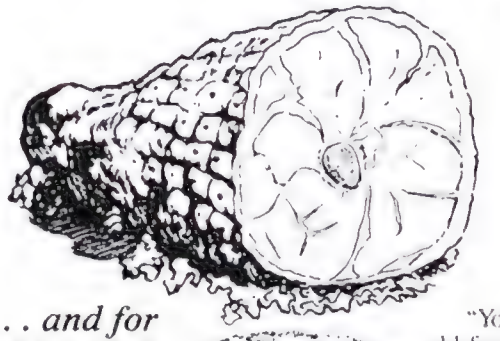

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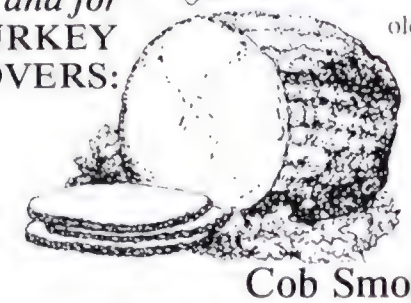

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cheetahs, other endangered cats will also benefit. The zoo team, collaborating with Florida officials, is already trying to save the Florida panther.

Laurie raised one cheetah herself. "I got her when she was just a handful of fluff, born at Wildlife Safari in Winston, Oregon, where I ran the cheetah program. We had plenty of room there and staff enough to work with individual animals, and the result was the most successful breeding record in North America."

Laurie managed to fit the little cheetah, Khayam, into a country household already bulging with dogs, a gibbon ape and French Alpine goats. (She has also helped develop the National Pygmy Goat Association.) Khayam was rather timorous and dependent. She'd walk beside Laurie around the property and to the village. She'd come when Laurie rang a bell. She was easily shouldered out of the way at mealtime. Then ABC's *American Sportsman* series sponsored a visit to Africa. Laurie took Khayam, almost full-grown at just over a year, to see if zoo-raised cheetahs could someday be introduced into the wild. Did they hunt instinctively or did they learn from their mothers? "Namibia wasn't at all like Oregon," says Laurie. "Khayam was scared at first and stuck very close to me."

It became clear that hunting was learned behavior. Laurie had taught the cheetah to run after a mechanical lure back in Oregon, and in Africa she took her to watering holes where hundreds of various antelope came to drink. "I'd lie in the grass with Khayam until one came close. Then I'd spring up and dash after it. Khayam would watch me with modest interest, then roll over and go to sleep."

But after a couple of months, the cheetah would lope along after Laurie. "She seemed to be thinking, 'Gee, Mom must want one of those things,' and she'd course it back toward me. Then she started tripping them, and finally she spilled one near enough so I could jump on top of it. She just looked at me that first time, but soon she got the idea. She made a few kills and brought them back to me, and when she started to eat, I'd pretend to take them away, and she would get aggressive toward me. That's what I wanted."

The "new" Khayam who came home to Winston was like a shrinking violet returning from a hitch in the Marines.

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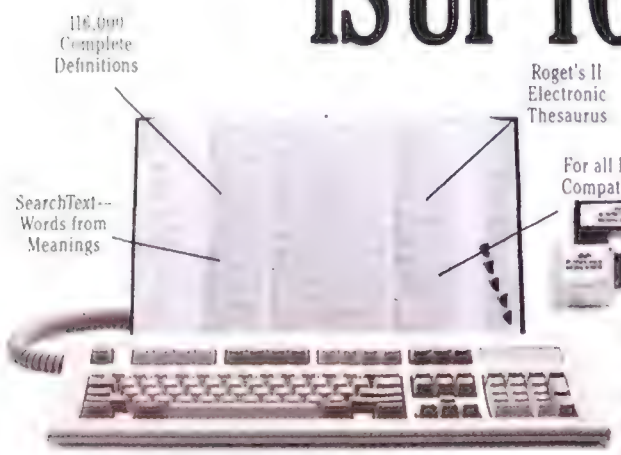
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"She was very sure of herself. She was still wonderful with people, but I noticed her looking at the goats differently."

Laurie used to take Khayam along when she lectured about the cheetah problem—they once came to the National Museum of Natural History. When the animal died at age 10—old for a cheetah—the town of Winston put up a bronze statue of her.

But the best memorial is Laurie Marker-Kraus' work at the National Zoo. NOAHS serves as a money-raising umbrella for research. Under it, top scientists work in the shiny new labs of the veterinary hospital, as well as at the National Institutes of Health, tracing genetic strengths and weaknesses in zoo populations of threatened species. Their hope is to engineer a lot more births like Mary Alice's.

Ann Donoghue saw the young test-tube tiger recently in the Omaha zoo, where Mary Alice now lives. "She's a little devil," Ann told me. "It's been hot all summer, and everyone's been wearing shorts—and she's got a fixation on bare legs. She's all over them with her mouth and paws."

"Sharpening claws on them?" I asked.

"That's next," said Ann. "Oh boy!"

Edwards Park

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Our rating system tells you at a glance what to see, covering 96 cities and all the key sights.

★★★ TAXCO Guerrero ◆◆◆

Map of Principal Sights p 6

Built on the sides of the mountains and the edge of the cliffs, Taxco is one of the most fascinating colonial cities in Mexico. The white walls of its buildings bring out the clear blue of the skies. The silhouette of **Saint Prisca** Parish Church (Parroquia de Santa Prisca) can be sighted miles off on the serpentine road leading to the city. Taxco's old cobblestone streets wind over the hills, disappear in mysterious nooks and often lead to romantic little squares that are bordered by simple whitewashed houses with red tile roofs.
But Taxco is not only a quaint historic town; it is also a renowned center for the production of silver objects, enlivened with the bustling activity of its silversmith workshops.

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HISTORICAL NOTES

In 1524 the Spaniards reached Taxco, where they found silver mines in the place today known as Old Taxco (Taxco Viejo) 12 km – 7.5 miles to the northwest. Years later the town was moved to Bermejo Hill – the ancient village of Telancingo – which contained still larger deposits of tin, and came to be called the **King's Gallery** (Socavón del Rey)

Mines of the Past. – Captains Rodrigo de Castañeda and Miguel Díaz de Auz took the Indians to work in the mines, founding the districts of Tlachcotecapan and Acayotlas or San Miguel and Guadalupe, as they are known today *(see map opposite)*. There the Franciscans built two chapels to evangelize the Indians. At the beginning of the 18C, José de la Borda came to Taxco to work the mines on a larger scale, thus giving a great boost to the area; at that moment the town received the name of Taxco, which in the Náhuatl language means "in the ball game."

With over 60 maps you'll spend time enjoying sights, not looking for them.

Today's Mines. – At the beginning of this century, with the opening of new roads, the city reawakened, thanks to the mining of silver, copper, zinc, lead and the famous fluorite mines – Azul and Gavilán – as well as the mercury mine of Huehuetoca. In addition, William Spratling, a North American who had fallen in love with the city, taught silversmithing in a workshop that brought international fame to Taxco and earned it the designation of National Monument

It is advisable to leave the car at or near Plaza Borda and to visit the city on foot, for which comfortable shoes are indispensable.

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SAINT PRISCA AND ITS SURROUNDINGS

time: 1/2 day – Plan p 191

This jewel of Mexican architecture is located on the east side of the city's main square, which is full of street vendors and tourists. Many artistic, cultural and religious events also take place in this square; for example, it is the gathering point for the famous **Holy Thursday** ★ procession, in which the penitents carry candles and heavy thorny burdens through the steep streets of the city

★★★ **Parish Church of Saint Prisca and Saint Sebastian** (Parroquia de Santa Prisca y San Sebastián). – This is an outstanding example of 18C baroque art. The work was sponsored by the wealthy miner, José de la Borda, who thus thanked Providence for bestowing on him the riches that came out of his mines and, by the same token, provided his son, Manuel, with a church where he could practice his vocation.
The parish church was dedicated to two Roman martyrs, Prisca and Sebastian. In 1748, the work began under the direction of the architect, Miguel Custodio Durán, assisted by the master builder, Juan Caballero. The altarpieces were commissioned to Isidoro Vicente Balbás, son of the architect, Jerónimo de Balbás, who designed the altarpiece in the Chapel of the Kings in the Metropolitan Cathedral of Mexico City *(p 107)*.

(Photo Kuligowski/VLOO/Paris)

Taxco. Parish church of Saint Prisca

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The object at hand

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How it came to pass would later be recalled this way: "One day well along in May [1903] a company of gentlemen were sitting in the University club in San Francisco talking over among themselves the progress of automobiling in the United States. During the discussion someone ventured the assertion that it would be practically impossible to drive an automobile all the way across the continent . . ." in less than 90 days.

One member of that company disagreed. He was Horatio Nelson Jackson, a 31-year-old doctor from Burlington, Vermont. Whether, as some would have it, Dr. Jackson, like Jules Verne's Phileas Fogg before him, actually bet on his own success is subject to debate. What is certain is that less than four days later, accompanied by a 22-year-old mechanic named Sewall Crocker, Jackson set out for New York by automobile. The machine in question was a second-hand Winton Touring Car he named *Vermont* (it's now in the Smithsonian's National Museum of American History).

Sixty-three days 15 hours later, and 20 pounds lighter, Jackson—with Crocker and a bull terrier named Bud, acquired en route—arrived at the corner of Fifth Avenue and 30th Street. Faithful *Vermont* was caked with mud, having been driven through California, Oregon, Idaho, Wyoming, Nebraska, Iowa, Illinois, Indiana, Ohio, Pennsylvania and New York. Jackson lost his first cyclometer somewhere in Idaho. He wasn't able to get a new one until he reached Chicago, so he never knew exactly how far they'd gone. Estimates ranged from 4,500 to 6,000 miles.

Details anon. First consider the state of America's roads and our automobile industry, creeping in low gear into the 20th century. The first-ever sale (by the Duryea brothers) of an American motorcar had been made only seven years before Jackson hit the road, a term far from figurative in those days. A contemporary critic described American roads

Aboard *Vermont*, a faithful 20 hp, two-cylinder, 1903 Winton Touring Car, H. Nelson Jackson (left), Sewall Crocker and Bud are duly recorded for history.

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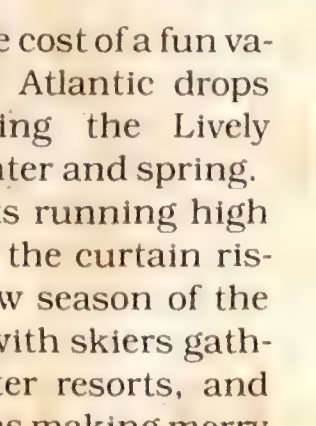

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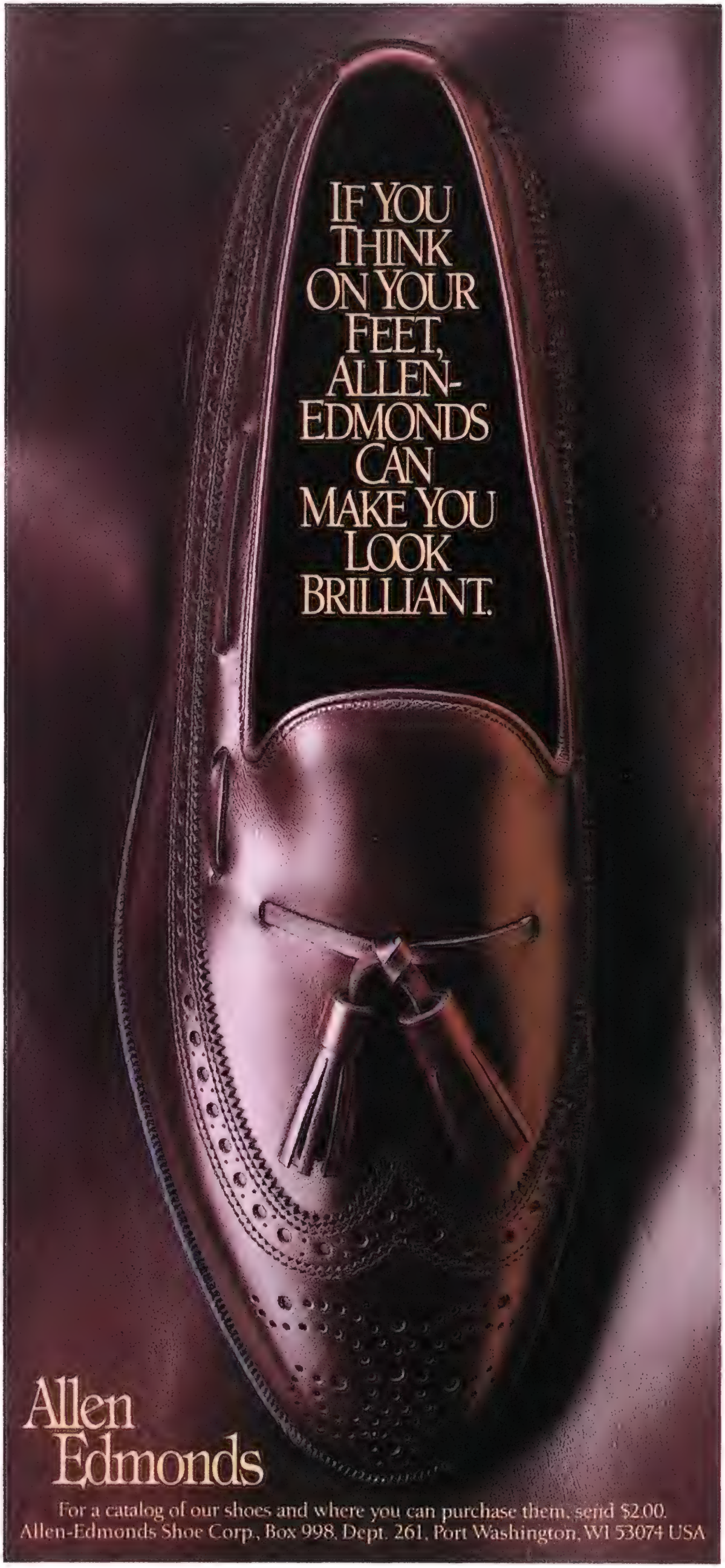

at the time as "inferior to those of any civilized country." A mere 150 out of 2 million-plus miles were paved—none except in cities.

Despite his name, Horatio Nelson Jackson seemed an unlikely man to conquer such a mare's nest of wagon trails. A graduate of the University of Vermont medical department, Jackson had married the daughter of a Civil War general who made a fortune with Payne's Celery Compound, a patent medicine compounded of, among other things, 20-percent grain alcohol. Comfortably heeled, the Jacksons had gone to California for the winter of 1902-03. At the time of the bet, if there was a bet, he had just become interested in the newfangled horseless carriage and hired Crocker as his instructor.

Consulted about a cross-country drive, Crocker recommended a 20-horsepower touring car made by the Winton Motor Carriage Company (until recently the Winton Bicycle Company) of Cleveland, Ohio. No new Wintons were to be had in San Francisco at that moment, but Jackson bought one with nearly 1,000 miles on it for $3,000—which was $500 more than the car's factory price—because Wintons were in demand and Jackson was in a hurry. (In 1903 the average American industrial worker made less than $500 a year.)

At any price, *Vermont* was a scarlet beauty with a two-cylinder water-cooled engine mounted beneath the seats amidships. Powered by a chain drive to the rear wheels, it boasted two forward speeds and one reverse. The chassis cleared the ground by less than ten inches, which caused near havoc on the rock-strewn trails across the mountains.

Having neither windshield nor roof, *Vermont* was also decidedly an open touring car. This was just as well, as *Vermont*'s crew needed every inch of space they could get. As Jackson later wrote Alexander Winton: "Our equipment . . . consisted of sleeping bags, rubber mackintoshes for the car and ourselves, leather coats, sweaters, canvas water bag, canteen, a cooking outfit, shot gun, rifle, pistols, ammunition, fishing tackle, a block-and-tackle with 150 feet of rope, a fireman's axe, a spade, two jacks, a vise, a set of tools, and two telescope valises for clothing." In a later account he added "a medicine chest, a few books, and—most useful of all—pneumatic mattresses of rubber." Not to mention gasoline—

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10 gallons in *Vermont*'s tank and 12 more in a tank strapped underneath the chassis.

Sporting goods aside, they used everything they brought—at least, everything that stayed with them. They had hardly started, for example, before their camping gear apparently bounced out—this despite a top speed (rarely achieved) of 20 miles an hour. Much of the time they had to stay in the lower of their two gears.

The plan had been to follow the right-of-way of the Southern Pacific Railroad, but on reaching Sacramento, Jackson learned that the passes through the Sierras were still blocked by spring snow. Unwilling to wait, the doctor decided to detour through Oregon. That added an extra 1,000 miles and was nearly a disaster. To begin with, many of the trails over the Cascades were very narrow. When the motorists met a wagon, they often had to back down to a place wide enough for passing. At the higher altitudes came rocks. Jackson and Crocker either had to move them or jack *Vermont* over them.

Wherever they met people, the people stopped and gawked. Outside of city dwellers, few Americans had ever seen an automobile. In Idaho a woman purposely gave them directions that took them 60 miles out of their way so that family members could get a glimpse of a horseless carriage. Not that most of the settlements they drove through were that far behind the times—at least not according to the Winton Motor Carriage people. In a publicity flier, "Across the Continent in a Winton," the company lyrically reported that wherever the two went, "no matter how far from the railroad and so-called civilization these places may be, they all exhibited some signs of western enterprise, and the sojourner even for a day is convinced that the march of empire has not only passed the Great Divide, but established itself even on its topmost ridge."

In Caldwell, Idaho, they met up with Bud, the bull terrier who graciously agreed to accompany them the rest of the way to New York. At times, Bud, like his human companions, wore goggles to keep the alkali dust out of his eyes.

Water was the worst problem. Not so much the rivers. When they came to a big one, they had to head upstream or downstream until they found a railroad bridge, then bumped across on the ties. At smaller streams, when *Vermont* got

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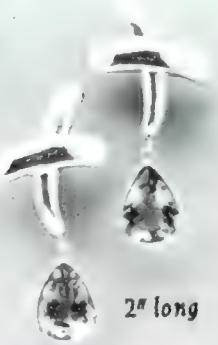

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stuck, Jackson and Crocker simply used their block-and-tackle to haul the car free. But on the road rain made life hellish, and it seemed to be raining much of the time. In northern California the rain turned the adobe earth into a putty that clutched at *Vermont*'s wheels. East of the Rockies, the rain turned the ground into so-called buffalo wallows.

Jackson later described a day of standing in mud and water up to his knees: "We had to pull the car out no less than 17 times. Fortunately we made the discovery that by planting our block-and-tackle [burying it deep in the ground] we would attach the end of the rope around the brake drum of the rear wheel . . . which, when the engine was started, would act as a windlass and thus extricate the machine by its own power."

This kind of bootstrap ingenuity was needed often. Once they broke the front axle. But they had to wire the Winton company for help only three times. The first time occurred when they needed new tires—despite the special care they gave the originals, wrapping them with burlap and rope and patching them time and again. Patching a "clincher," a narrow tire that fitted into the wheel rim, wasn't easy. Writing in *American Heritage* (June-July 1980), Stephen Sears described the process as "a trial of strength, endurance, and temper: breaking loose the beads from the rim flanges with tire irons, painstakingly patching the tube, reinstalling tube and casing, then the long minutes at the hand pump."

The second time Jackson and Crocker wired Winton was from Rawlins, Wyoming. A studbolt from one of the connecting rods had broken, piercing the cover of the crankcase. They had to wait five days for the needed part to arrive from Cleveland. The same thing happened again just down the road near Archer, Wyoming.

How did they get gas? There were no gas pumps, of course. But happily, the gasoline used in early automobiles was the same as the fuel used in home stoves and was available at hardware stores pretty much everywhere. Our motorists ran out only once. To get more, Crocker, who had lost the coin toss, had to walk 29 miles to Burns, Oregon. Later, in Medicine Bow, Wyoming, they were short on gas, and a storekeeper charged them $1.05 per gallon—three times the normal price. The

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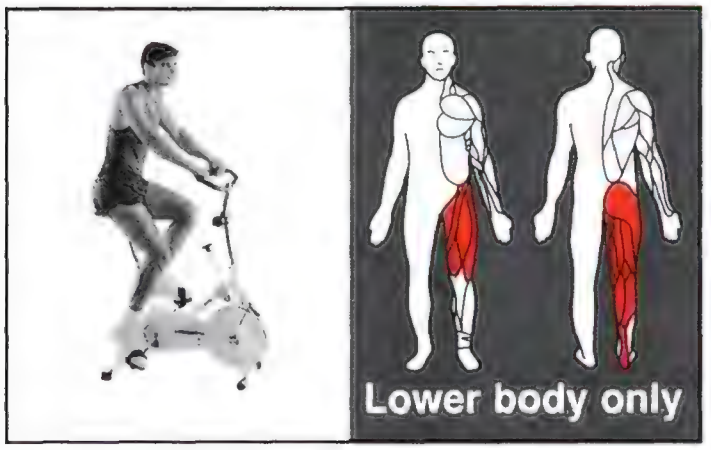

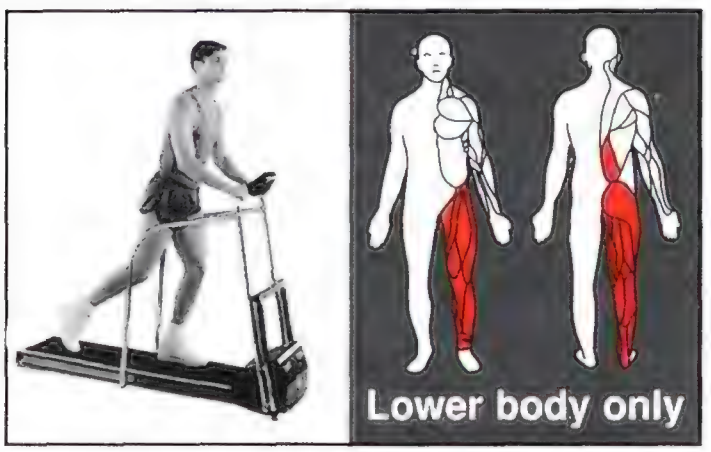

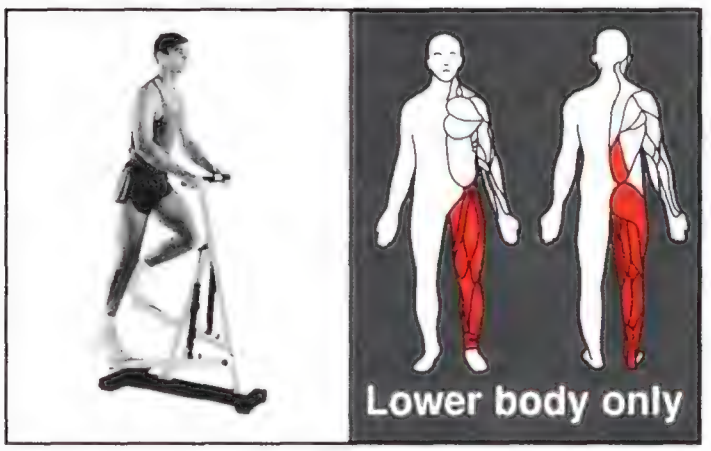

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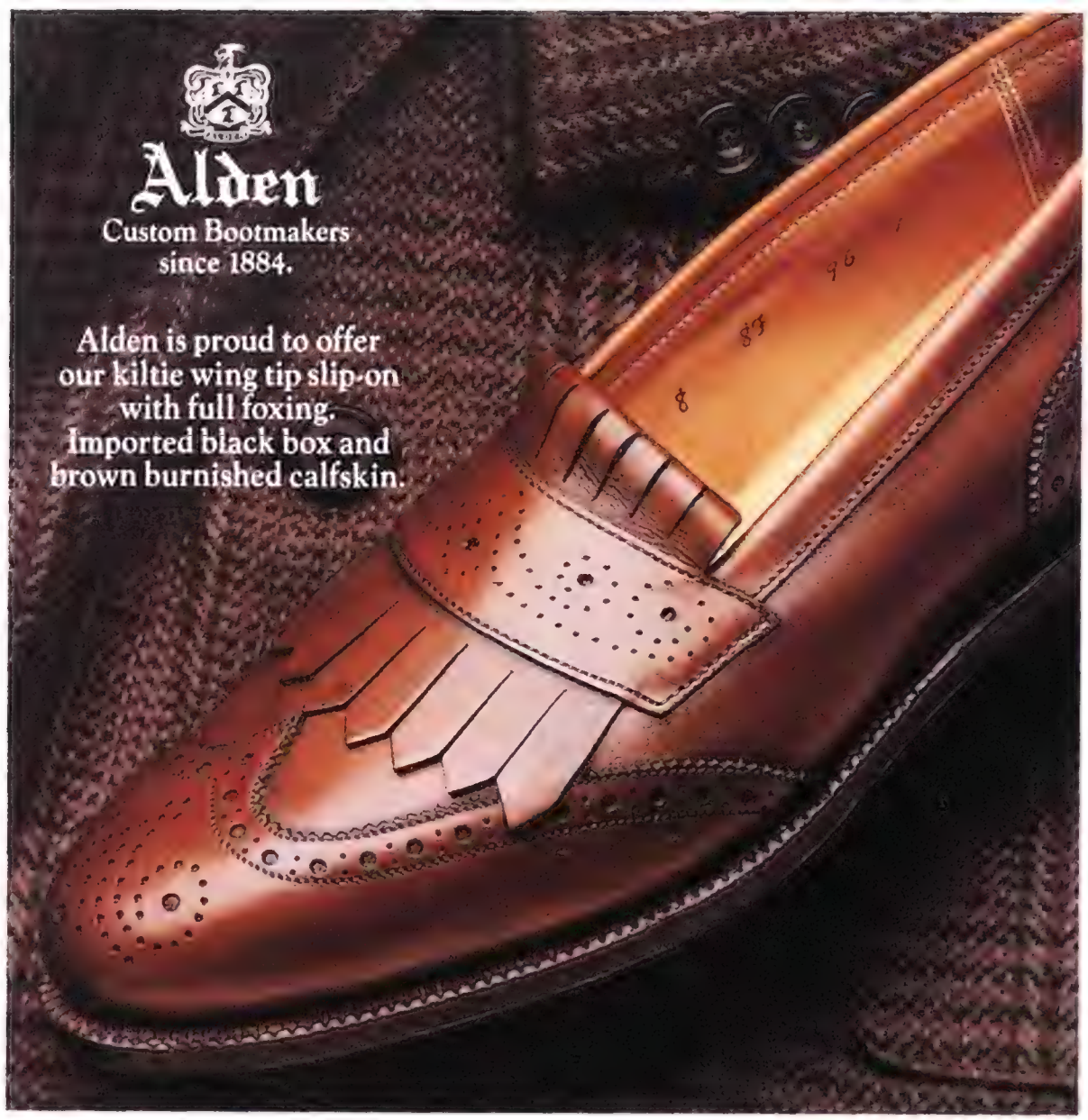

For complete store listing and illustrated brochure, write: Alden Shoe Company, Dept. 10S, Middleborough, MA 02346.

Winton, experts say, probably got about 7 miles to a gallon.

Once, having lost their larder, they had to go 36 hours without food before meeting a shepherd who cooked them a feast of mutton and canned corn. Except for Bud, if they came face-to-face with a fierce animal they never reported it.

They did meet some Italian immigrants near Bitter Creek, Wyoming, and made a deal: *Vermont* would haul the Italians' heavy baggage to the next town, and on the way, the Italians would pull *Vermont* out of the mud.

Perhaps as worrisome as anything was the news that reached them some 50 days out of San Francisco: they had transcontinental competition. Tom Fetch and Marius Krarup were headed east in a Packard, and Eugene Hammond and L. L. Whitman had set off in a curved-dash Oldsmobile. But once well over the Medicine Bow Range in Wyoming, it was downhill most of the way for Jackson and Crocker. (To avoid the Alleghenies they took a water-level route around Lake Erie.) The second half of the trip, from Omaha eastward, took only 12 days.

Finally, at 4 A.M. on Sunday, July 26, *Vermont* rolled down New York's smoothly paved Fifth Avenue. The first transcontinental trip by automobile was history. The human travelers had been on the road 45 of the 63 days that had elapsed since they'd left San Francisco. In its story of the adventure, the New York *Sun* reported the following day that *Vermont* had spent the night in "an uptown storage station"—the word "garage" was not yet in common use.

After a few days of subdued festivities in the metropolis, Jackson drove his automobile back to Vermont, where—courtesy of Payne's Celery Compound, at least in part—he would one day own the newspaper and run a radio station, and become president of the Burlington Trust Company. A fellow citizen who worked with him years later remembers him as "a good-natured old buccaneer who loved animals. Sometimes he carried a little dog in his pocket."

In the end the good doctor estimated that the whole trip cost him about $8,000 for everything—the price of the car, Crocker's salary, about 800 gallons of gasoline and two sets of tires. And a $5 fine for exceeding Burlington's six-mile-an-hour speed limit when Horatio Nelson Jackson drove *Vermont* back into his old hometown.

Thomas H. Wolf

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By Jack Fincher

The hard fight was getting into the fight at all

After 130 years, Americans are finally learning about the late, anguishing role black soldiers played in the Civil War

It was a charge to remember, that doomed three-quarter-mile rush down a naked beach and up the bristling earthworks of Fort Wagner. When it was over nearly half the 54th Massachusetts, a black regiment of 600 volunteers, had been killed, wounded or captured. Col. Robert Gould Shaw, 25, the pride of his Yankee abolitionist family, fell at the head of his men and was buried in a common sandy grave "with his niggers," as Confederates who buried him would put it.

For some five million Americans who have lately seen the film *Glory*, as well as the recent monumental public television history of the Civil War, the 54th's brave action has stirred interest in what was, for decades, too often ignored—the role of black men in the war that ended slavery. Some 130 years ago, too, Americans were stirred by that demonstration of black courage. "If this Massachusetts Fifty-Fourth had faltered when its trial came," the New York *Tribune* would write, 200,000 black troops "for whom it was a pioneer would never have been put into the field."

But crucial as that moment in mid-July 1863 was, the men of the 54th were not the only pioneers. Black courage in battle had been proved in the American Revolution and in the War of 1812, though white Americans kept refusing to credit it. During the Civil War, the hardest problem for black men was not in being brave; it was in getting a chance to fight at all. At every step, they were confronted with racial scorn and fear, created by the long existence of slavery itself.

Few events offer a better way into the agonies and

A 19th-century lithograph romanticizes assault on Fort Wagner by troops of 54th Massachusetts Regiment.

Some 600 men attacked July 18, 1863; more than half were killed or wounded, including Col. Robert Shaw. But their effort stirred national admiration and helped to give other black units a chance to fight.

Before-and-after pictures like these—of a drummer boy in a new black regiment—encouraged enlistment.

ambiguities involved than a scene that *Glory* didn't show. Only a few days before the black troops of the 54th stormed Rebel ramparts outside Charleston, South Carolina, other blacks—one related to a member of the 54th—had been killed in the streets of New York City by white rioters.

Most of this was the work of immigrants protesting President Lincoln's latest call for a new federal draft. Union armies had just won their two greatest victories of the war. On July 3, 1863, Lee was defeated at Gettysburg, ending Northern fears that England and France might recognize the South as an independent nation. The next day Vicksburg fell, after 47 days of siege, all but cutting the South in two and threatening to make the Mississippi a Union canal. As usual, casualties had been appalling, and volunteers had long since proved insufficient. But the draft had certain loopholes. Anyone could be exempted from service till the next draft call by paying the government $300, or exempted till war's end by hiring a substitute to fight in his place.

Economics and racism thus combined to make scapegoats of free blacks. Predictably, it had been rumored they were just waiting to step into the jobs left behind when white New York conscripts marched away. The nation was already two years into a war that would claim as many lives as all other U.S. wars including Vietnam. Yet as everyone knew, only a handful of blacks had done any fighting.

"This is a white man's war!"

How this came to be so is a tortuous chronicle of politics and racism. When the war started, most men in the North, including military officers, thought that blacks couldn't fight. Early in the war blacks who tried to form a defensive home guard in Cincinnati were threatened by a mob and dispersed by police. Whites shouted at them, "We want you damned niggers to keep out of this, this is a white man's war!" But in political terms, the successful effort to keep blacks from fighting for the Union and their freedom was to a large extent the work of Abraham Lincoln, the man now rightly known to history as the Great Emancipator.

Well into the fighting, Lincoln hoped to save the country from the appalling destruction of a long war, somehow bringing the Southern states back, through a negotiated cease-fire and some informal plan for the gradual and recompensed emancipation of slaves. Yankee abolitionists were still seen as zealots and troublemakers. Political support for the war was shaky in the North, and most of it came from people who wanted to save the Union, not get killed to free the slaves. Preserving the Union was Lincoln's rallying cry. Well into 1862, he made his priorities clear: "If I could save the Union without freeing any slave, I

Just three days before Fort Wagner assault, blacks were butchered by New York mob protesting the draft.

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Popular song featured black troops with a white colonel who, like Shaw, died in battle with his men.

would do it; and if I could save it by freeing all the slaves I would do it; and if I could save it by freeing some and leaving others alone, I would also do that." Meanwhile it was all-important to keep the slave-owning Border States, Kentucky, Missouri, Delaware and Maryland, from joining the South. (In Maryland's case, he would demonstrate his deadly seriousness on this subject by sending federal troops to shut down a session of the State Legislature meeting in Frederick when representatives seemed about to vote for secession.)

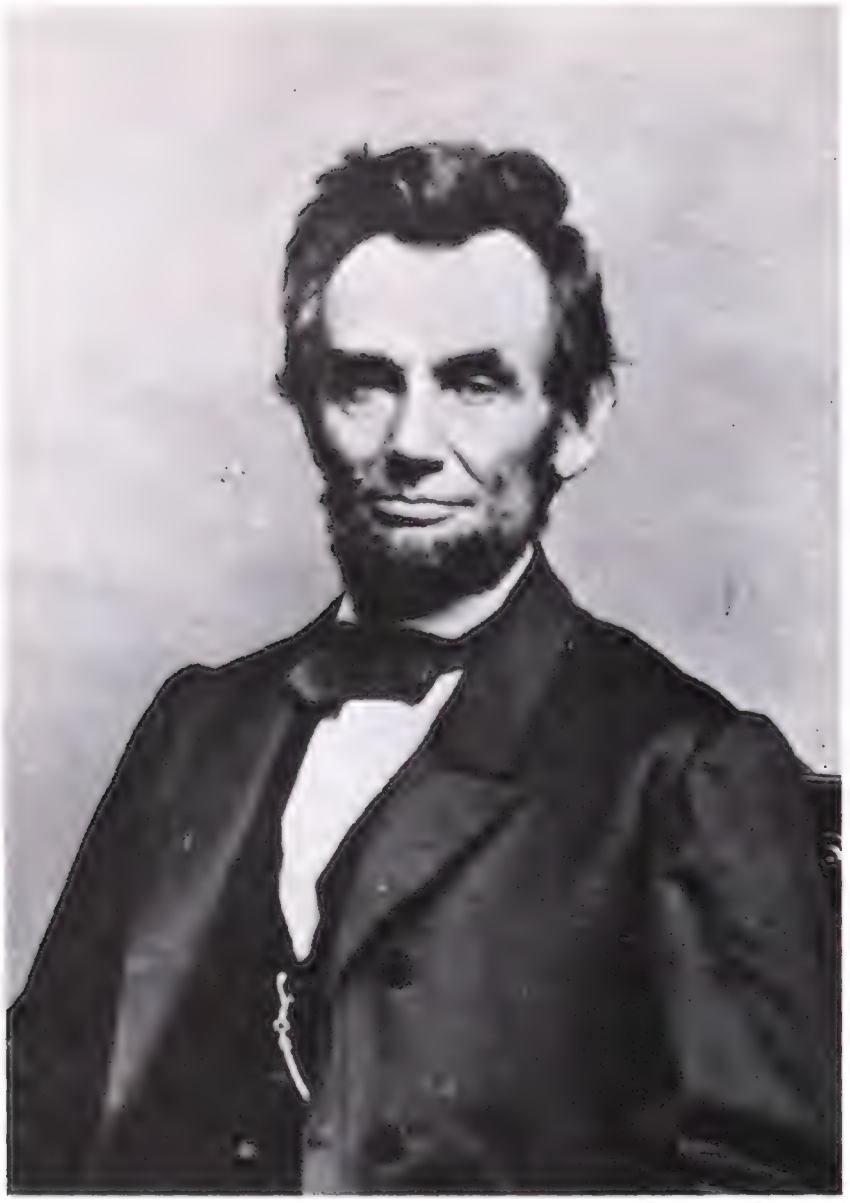
Blacks petitioned the President early on for a chance to fight and flocked to enlist. Everywhere they were rejected. Even after Congress had authorized black troops, when Indiana offered to contribute two black regiments, Lincoln replied, "To arm the negroes would turn 50,000 bayonets from the loyal Border States against us that were for us."

The great antislavery leader Frederick Douglass called upon Lincoln to use blacks in the war. "Once let the black man get upon his person the brass letters, U. S., let him get an eagle on his button, and a musket on his shoulder," Douglass declared, "and there is no power on earth which can deny that he has earned the right to citizenship in the United States." As new calls for volunteers were made, he struck pungently at what he saw as the illogic and unfairness of Lincoln's position. The government keeps screaming "Men, men! send us men!" he wrote. The edifice of state was burning, but the government would let only "Indo-Caucasian hands" help put out the fire.

Pressure from blacks eager to fight, from abolitionists and from a few Army officers who needed men, as well as changing circumstances, eventually altered Lincoln's policy. Along the way, convoluted legal questions involving the Constitution and slaves as property had to be got around. According to the Supreme Court's 1857 Dred Scott decision and the Fugitive Slave Act, slaves were beings without the rights of citizens, property that had to be returned to owners, no matter what.

After secession but before the war had started at Fort Sumter, Lincoln tried to limit the rift between the states by pledging in his First Inaugural Address that the government would not interfere with slavery where it already existed. Constitutional law naturally applied in more dramatic and perplexing terms to the thousands of slaves who soon began fleeing their white masters and taking refuge behind Union lines.

War had hardly begun, in May 1861, when Benjamin Butler, a worldly political general from Massachusetts, adopted the dodge of treating escaped slaves not as returnable property but as captured "contraband of war." On August 30, Gen. John C. Frémont, a hero for his role in claiming California, and the defeated Republican candidate for President on an antislavery platform in 1856, tried to expand the franchise.



In Battle of Milliken's Bend, black troops proved capable of defending against attack in close quarters.

Until well into the war, Abraham Lincoln insisted his purpose was saving the Union, not freeing slaves. Caught in a mini civil war in Missouri, he put the whole state under martial law and declared that slaves of anyone who took up arms against the Union were forfeit—and forever free. Lincoln sacked him. In December, Secretary of War Simon Cameron publicly declared that a time would come when the government would not only have the right but the duty to use freed slaves in the war to suppress rebellion. Cameron had been a loose cannon in other ways, too. Now, Lincoln banished him as U.S. Minister to Russia.

In the new year Lincoln's new Secretary of War, Edwin Stanton, reiterated the Administration's position: blacks, slave or free, were not to fight. But in May 1862, in the Sea Islands and along the coasts of South Carolina, Georgia and Florida, which Union forces had occupied with little resistance, Maj. Gen. David Hunter proclaimed martial law, telling all slaves in his jurisdiction that they were free. In South Carolina he began recruiting them, sometimes at gunpoint. Without approval from Washington, however, the experiment was abandoned.

Throughout the year, casualties kept mounting. So did the political drumbeat from black newspapers and abolitionists, and from officers tantalized by a source of soldiery nearby, yet unable to make use of it. Though George B. McClellan had mostly managed to avoid fighting, other generals had engaged the enemy, with bloody results. In the spring of 1862 at the Battle of Shiloh on the Tennessee River, nearly 100,000 men fought for two days, with 23,000 casualties. It was a draw, with a slight edge to a chunky, unshaven, cigar-smoking general named Ulysses S. Grant. After Shiloh, General Grant gave up all hope of saving the Union with just a few victories and some kind of political compromise. It would take total war and "complete conquest" of the South. And that meant many more men to kill or be killed.

Down in New Orleans, where the North established a large bridgehead at the mouth of the Mississippi, astute and well-connected General Butler had lately become military governor of New Orleans. For weeks he had dickered with Washington about how to deal with the problem of using blacks in the war. Now he took action, knowing that at last he might receive official approval. On August 22, Butler shrewdly recruited as part of the federal forces in the area the 1,400-man Louisiana State Guard, an elite force of free black volunteers. They had formed the guard themselves, but the South never called them to combat (SMITHSONIAN, March 1979). When Union forces took

Among the writer's recent SMITHSONIAN *articles: the 1918 influenza epidemic (January 1989); women's baseball (June 1989); fingerprinting (October 1989).*

Till then Army stereotype had insisted that they were good mainly for wild, high-speed, offensive charges.

Antislavery publisher Frederick Douglass took Lincoln to task for refusing to use black men to fight the war.

New Orleans the guard refused to follow the retreating Confederate Army.

Feeling such pressures, Lincoln came to the same conclusion as Grant, and was at last sure that the war could not be won without the abolition of slavery. In the summer of 1862 he secretly told his Cabinet about the Emancipation Proclamation. It would be announced after the next successful battle, to take effect in January 1863. Even so, freedom would be limited to slaves in areas in open rebellion against the Union. Slavery was still firmly in place in the Border States and Tennessee, and in Union-occupied portions of Virginia and Louisiana.

The dam was broken, however. Congress passed a new Militia Act, permitting the President to use "as many persons of African descent" as he needed "for suppression of the Rebellion." It also repealed a 1792 ordinance barring "persons of color" from serving in the militia. Free blacks and ex-slaves would be recruited, but they were regarded as laborers and their pay was not to be as much as that of white soldiers—$10 a month less clothing expenses, rather than $13 plus clothing expenses. They were not to have black officers, either.

When Frederick Douglass confronted Lincoln personally about these discrepancies, he was told that the whole idea of blacks as soldiers would be hard for the country to digest. Once that had happened, matters such as pay would be reconciled. About 100 blacks did eventually get commissions in the Union Army; 2,000 became noncommissioned officers.

In September, at Antietam Creek in Maryland, the Union Army under General McClellan finally gave Lincoln something like the victory he needed. Five days after the battle, the President made public his preliminary Emancipation Proclamation. In response, the South declared that captured slaves in Yankee uniforms, as well as their white officers taken in battle, would be executed. Hundreds of Northern soldiers deserted rather than serve with blacks; two Illinois regiments had to be disbanded as a result.

Nevertheless, the recruiting of blacks in Northern states went on apace. Wherever the Union armies were operating, teams of recruiters were authorized to offer $100 to $300 enlistment bounties. This was the period in which Gov. John Andrew of Massachusetts created the celebrated 54th Regiment, mostly composed of literate freemen, recruiting young Col. Robert Gould Shaw as its commanding officer.

Frederick Douglass proved right about the effect of weapons and uniforms on ex-slaves. Especially to men who risked terrible punishment, perhaps death, to escape—who stumbled on foot through the dark toward distant guns in the hope the guns were in friendly

A French magazine ran this picture of ex-slaves at work in a Union forge in 1864. By then, though thousands of blacks were soldiers, many more were employed by the Northern armies as civilian laborers.

hands—the soldierly ritual that followed enlistment had considerable power. Each man was stripped and bathed, his old clothes burned, his Army blues put on. One white soldier described the process: "Put a United States uniform on his back and the *chattel* is a *man*." Black recruit Elijah Marrs, who escaped slavery in Kentucky to join the Union Army, remembered the moment more simply: "I felt freedom in my bones."

Many were treated well and trained well. But many were brutalized, even by Army standards—until some said they were no better off than slaves. Many got inferior equipment and medical care. They died of diseases in the field at nearly twice the rate of whites. Of some 180,000 black men to serve in the Army, only about 2,800 died in combat; 34,000 were taken by disease.

The matter of inferior pay was somehow harder to bear, perhaps because it involved both hardship and principle. One of *Glory*'s most dramatic scenes, in which the young Colonel Shaw joins his men in tearing up their pay chits rather than take less money than whites, did not actually take place. But Shaw did write Governor Andrew that his regiment would refuse pay until the matter was corrected. In this Shaw was an exception. All over the country white officers backed their troops in the struggle for equal pay, but ultimately urged them to take what they could and get on with the war. So did many black leaders. But some soldiers remained adamant. "Do we not fill the same ranks?" a private wrote. "Do we not take up the same length of ground in the grave yard?"

The government continued to welch on pay (it did not make amends until 1864 and then only partially). The situation was ripe for some kind of martyr. In 1863, after rumors of the New York draft riots and the Fort Wagner charge had spread throughout the Army, William Walker, a black sergeant in the 3d South Carolina Volunteers, became one. He ordered his men to stack arms because they would "not do duty any longer for $7 per month." It was clear that he had no idea of the gravity of his act in an army in wartime. Tried and convicted, Walker was executed for mutiny.

The 180,000 black soldiers in uniform by war's end represented nearly 10 percent of all Union forces. This at a time when blacks accounted for only 1 percent of the North's population, as opposed to 13 percent of the whole country, the same percentage as today. Despite their own zeal to volunteer, and objections from their own officers and abolitionist leaders, relatively few were ever allowed to see action. Black soldiers drew excessive fatigue duty, backbreaking work behind the lines that took time away from the training on which their lives might depend in battle. One private from Louisiana actually wrote a letter of complaint to the President: "Instead of the musket It is the Spad[e] and the Wheelbarrow and the Axe."

The first real clash between black troops officially recruited into the Union Army and Confederate soldiers did not take place until the war was almost half over. The time was January 1863. The outfit was the 1st South Carolina Infantry. The commander, by no coincidence, was Thomas Higginson, a Boston abolitionist already renowned for supporting the idea of blacks as potential combat soldiers. The mission: to free slaves and confiscate lumber at the head of the St. Mary's River on the border between Georgia and Florida.

Shortly after midnight, at the head of a hundred handpicked infantry, Higginson marched through thick forest toward a Confederate camp—and a skirmish that, partly because of his eloquence, has become known to history as the Battle of the Hundred Pines.

"Nobody knows anything about these men who has not seen them in battle," Higginson wrote in his remarkable memoir, *Army Life in a Black Regiment*. "I find that I myself knew nothing." In the dark his troops met some Rebels. "They were as cool and wary," Higginson reported, "as if wild turkeys were the

only game," and they fought with a "fiery energy" he had seen matched only by French Zouaves. A brief firefight followed, in which one soldier was killed and seven wounded, as against ten of the enemy killed, including their lieutenant. The rest were routed. Glowingly, Higginson reported, "No officer in this regiment now doubts that the key to the successful prosecution of this war lies in the unlimited employment of black troops."

These views were intended for Northern newspapers, but other observers confirmed them. The enthusiasm, loyalty and humor of black troops were all noted. White commanders, accustomed to having their authority resented, were pleased by the touching allegiance many enlistees showed them. Black volunteers in South Carolina were on their own home ground and new to war. When the bugle sounded for battle, they didn't go on sick call in droves to avoid fighting, as now often happened in battle-weary white outfits.

On the other side of the war, on the lower Mississippi, where Adj. Gen. Lorenzo Thomas had been raising black regiments from escaped slaves, officers also had a high regard for the new troops. Col. Robert Cowden, later the commanding officer of the 59th U.S. Colored Infantry, noted that the Army had to get rid of "plantation manners," including "awkward bowing and scraping, with hat under arm, and with averted look." Once uniformed and trained the men were good soldiers, he reported, except that, because their only free time as slaves had been during the hours of darkness, they were used to leaving camp at night. Strict discipline was needed, said Cowden, so that they would retire at 9 P.M. and "*stay retired* till reveille."

Stereotyping was common. When given a chance to fight, black troops seemed to excel at quick, all-out, headlong assault—which was encouraged because of the psychological effect it was supposed to have on Confederate fears of uncontrollable slave "savagery." As a result, the notion grew that black soldiers were of little use in tough, rearguard action but charged with a "terrible fierceness." This general impression persisted, despite a brave showing in two bitter fights that occurred far away on the Mississippi.

Complete control of the great river required the capture of Port Hudson in Louisiana, another Rebel bastion on the river, 250 miles south of Vicksburg. A short march north from Baton Rouge, Port Hudson was defended by 6,000 Confederate troops in heavily fortified positions and had been under siege for weeks that spring. On May 27, 1863, among those forces ordered to make the almost impossible assault were elements of the 1st and 3d Louisiana Regiments, both black. But the 1st had been the Louisiana State Guard, the only regiment with black officers, most notably Capt. André Callioux, a Paris-educated Louisiana landowner who proudly called himself the blackest man in New Orleans.

Six times, a thousand black soldiers of the 1st and 3d charged across an open field against high battlements. Six times, they were driven back by rifle and mortar fire, grapeshot and canister. After each charge Callioux led them forward again, the last time with his arm smashed at the elbow by a rifle ball. There were 212 casualties, with nearly 40 killed, including

The most famous atrocity of the war occurred in 1864 at Fort Pillow, Tennessee, when Rebel troops under Nathan Bedford Forrest killed black soldiers after their surrender. "Remember Fort Pillow!" soon became a rallying cry for blacks.

An unknown soldier with a cigar gravely posed for a formal portrait with his wife before going to war.

André Callioux. Except for undeniably demonstrating courage and discipline, these men fell in vain.

Less than two weeks later, on June 7 at Milliken's Bend, 1,400 Union soldiers—the remains of two white companies and three black regiments—took the brunt of a charge by 1,500 Texans. In close combat marked by terrible bloodshed, the men beat back the Rebels. Word went out: the novice black soldiers had held their ground defensively against a seasoned assault.

After the battle, Capt. M. M. Miller, of the 9th Regiment of Louisiana Volunteers of African Descent, wrote his aunt back in Galena, Illinois, "I never more wish to hear the expression 'the niggers won't fight.'" "The bravery of the Blacks in the battle at Milliken's Bend," Assistant Secretary of War Charles Dana optimistically concluded, "completely revolutionized the sentiments of the Army." The stage was now set for the doomed 54th Massachusetts and Robert Gould Shaw to demonstrate black courage on a national scale.

By the time Shaw's regiment arrived, Northern forces in South Carolina were at last able to turn their attention to the necklace of heavily fortified islands that adorned Charleston harbor, and to Fort Sumter, where the war had started. The key to the Confederate defense was Fort Wagner. When the attack was planned no black troops appeared on the order of battle. "Our whole experience, so far, has been in loading and discharging vessels," Shaw wrote two weeks before the battle. "I feel very much disappointed." He complained to Brig. Gen. George C. Strong, arguing that "the colored soldiers should be associated as much as possible with the white troops, in order that they may have other witnesses besides their own officers to what they are capable of doing."

Shaw's connections, as well as his logic, were not lost on his superiors. Orders arrived on July 8: be ready to move at an hour's notice. Ten days later, the 54th Massachusetts was poised before Fort Wagner. Three brigades would mount the attack, and Shaw had offered the 54th as its spearhead.

"We may as well get rid of them"

Seasoned brigade commanders thought a charge up an open beach against defenses as forbidding as Fort Wagner's was foolhardy, but the assault commander, Maj. Gen. Truman Seymour—"a devil of a fellow for dash"—overruled them. The fort, he thought, would be softened by a massive daylong artillery bombardment. Beyond that, according to later testimony before the American Freedmen's Inquiry Commission, Seymour told the operating commander, Maj. Gen. Quincy Gillmore: "Well, I guess we will . . . put those damned niggers from Massachusetts in the advance; we may as well get rid of them one time as another."

All during the day of July 18, Union artillery banged away at the fort. Shortly after 6:30 P.M., 600 men of the 54th formed two wings and moved slowly up Morris Island beach. Just beyond reach of Confederate artillery, they lay down. Shaw dismounted and sent his horse cantering to the rear.

At 7:45, the bombardment stopped and the attack signal came. Shaw spoke to his soldiers: "Move in quick time until within a hundred yards of the fort, then, double-quick and charge!" Off they rushed into history, as 1,700 Confederate riflemen—almost six times as many as Union military intelligence had said were in Fort Wagner—clambered from their shell-battered bombproofs and raced to the ramparts (only eight of them died from the Union bombardment). Confederate batteries, mostly silent during the day to save ammunition, now opened up from the harbor's other islands.

Just before battle, Sgt. Robert Simmons, one of Shaw's men, sent a prophetic note to the members of his family, who only three days before had been under violent racist assault back in New York City: "God bless you all! Good-bye!" Despite a moat, some wire and a rifle pit, Shaw and a few of his men actually reached the parapets of the fort before being cut down by fire. The rest, less than half of the assault force, were driven

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Engraving used in the first history of blacks in war, published in 1888 by a black Union soldier named Joseph Wilson, depicts Yankee cavalrymen herding Rebel captives along the streets of a Southern town.

back. For having carried the regimental colors despite multiple wounds, Sgt. William Carney became the first black to win the Medal of Honor. "The old flag never touched the ground, boys!" he shouted.

As so often happens with military disasters, the most elementary things had been left undone. "There was no provision for cutting away obstructions, filling the ditch, or spiking the guns," Regimental Historian Luis F. Emilio wrote afterward. "No engineers or guides accompanied the column; no artillery-men to serve captured guns; no plan of the work was shown company officers. . . ."

The attack once again indisputably showed black courage in battle. It also had other effects. One involved the treatment of prisoners. When the Confederate Army refused to exchange prisoners captured during the siege, word spread that those taken alive had been put to hard labor and might be sentenced to death.

If Northern admiration for the gallant 54th was enormous, Northern outrage at mistreatment of prisoners matched it. Within a fortnight Lincoln announced the Union would answer atrocity man for man. Sporadic eye-for-an-eye retribution set in, reaching some sort of apogee on April 12, 1864, at Fort Pillow, Tennessee. There, Gen. Nathan Bedford Forrest and 1,500 Confederate cavalrymen overwhelmed a 570-man, racially mixed garrison, driving survivors into the Mississippi, which was soon, in Forrest's words, "dyed with the blood of the slaughtered for 200 yards." After their surrender, scores of the black soldiers and some of the white soldiers were murdered. For black soldiers, "Remember Fort Pillow!" became a rallying cry, giving them a reason both to fight to the death and to offer no quarter. As another fallout from Fort Wagner, Fort Pillow deeply impressed on white enlisted men the danger of fighting alongside blacks in battle.

Retaliations escalated well into 1864, as the Union realized that victory would require the destruction of the South. Union general William T. Sherman laid waste to Georgia. Grant, at last promoted to commander of all Union armies, smashed away at Lee in Virginia with overwhelming numbers. The appalling series of battles of attrition that resulted became known as the Wilderness to Petersburg Campaign. In six weeks of fighting, Northern casualties amounted to 65,000; Southern, 35,000.

In the North, meanwhile, the 1864 Presidential campaign was being waged, with the Democrats running George McClellan against Lincoln on a "stop the war" platform. Though the war, begun as a fight to save a political union, had become a crusade to free blacks from slavery, the continued carnage with no sign of victory made the Democrats' cause popular, especially in the Midwest, where Yankee abolitionists were still far from loved and dying to free slaves was not exactly popular.

All through the late summer Lincoln was sure he would be defeated, especially without some dramatic military victory to show for the years of killing. But Grant's attempt to wear out Lee and take Richmond ended in the siege not of the Southern capital but of Lee's prime remaining supply depot, Petersburg, Virginia, 20 miles away. During the resulting stalemate, another legacy of the fatal charge of the 54th Massachusetts—government sensitivity to the political implications of consigning black soldiers to slaughter—contributed to one of the more bloody and bizarre blunders of the war.

After five days of Union failure to take Petersburg, Lt. Col. Henry Pleasants, a former mining engineer from the Pennsylvania coal country, offered a daring

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The right choice.

A lone soldier slumps on the edge of what was once a trench in still-raw, exploded earth at Petersburg, where the disastrous Battle of the Crater was fought. It is May 1865 and the Civil War has been over for a month.

plan: to tunnel under the Rebel lines and set off a huge blast of dynamite—enough to blow an opening so big that the superior numbers of the North could sweep past dazed and demoralized defenders and wheel toward Richmond.

A 510-foot tunnel, one of the longest of its kind ever dug, was created by troops of the 48th Pennsylvania Infantry, many of them coal miners by trade. On July 27, its two 40-foot lateral galleries beneath Rebel lines were packed with four tons of fused and tamped gunpowder.

Maj. Gen. Ambrose Burnside's four divisions had been chosen to provide "shock troops" to exploit the general chaos that would follow the blast. He selected for special training Gen. Edward Ferrero's black 4th Division. They were new men, untested in battle; his white soldiers were by then exhausted from the Wilderness fighting. Two days before the detonation and long after the 4th had mastered its plan for an attack on both sides of the area that was to be exploded, Burnside's superior, Maj. Gen. George Meade, the victor at Gettysburg, abruptly vetoed the plan. Grant backed Meade. "It would then be said," he later testified before Congress, "that we were shoving those people ahead to get killed because we did not care anything about them."

Burnside allowed the white division that would lead the attack to be chosen by lot. Tragically, the short straw fell to Brig. Gen. James Ledlie's 1st Division. Ledlie was a drunk, an incompetent and a coward whom Grant once described as "the poorest division commander that General Burnside had." The 1st Division was a collection of former artillerymen for whom Burnside had little regard, labeling them "worthless."

When the explosion went off, the resulting havoc was beyond anyone's expectations. Most of a Confederate regiment and several artillery pieces disappeared entirely. The fort was blown apart. Confederates on both sides of the crater ran in horror. "Stones, timbers, arms, legs, guns unlimbered and bodies unlimbed" rained back down into the dust-filled, sulfurous crater, 170 feet long, 80 feet wide and 30 feet deep. Ledlie was back in a medical tent, drinking, as his 1st Division stumbled blindly forward through a narrow opening in the Union trenches and into the reeking crater. Caught there, they did not fan out to either side as the plan had intended them to, but having lost critical momentum and nerve, sought cover in the crater and huddled clinging to the shattered, blood-wet earth. Brigades from the 2d and 3d Divisions followed, to be lost in the smoke and confusion. By the time the black 4th Division was sent forward, the Confederates had recovered and were mounting a counterattack. The 4th was caught in a withering fire. Buckling at last, the black soldiers also retreated, many falling into the crater.

When the smoke had cleared, the Union had lost 3,798 men killed, wounded or missing.

Reports of the fiasco provided one of the sorriest footnotes of the war. Some Confederate soldiers had followed the 4th down into the crater and killed wounded blacks who were trying to surrender. They, too, remembered Fort Pillow. That was predictable. But there was worse news from the Union side. It was asserted that white Union soldiers bayoneted Union blacks to preserve themselves from Confederate vengeance. According to George Kilmer, a white artillery-

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man from New York, "Men boasted in my presence that blacks had thus been disposed of."

A lengthy court of inquiry also confirmed that the black division had lost far more men than any of the white divisions. As to white soldiers killing black soldiers, that was never looked into. No one was ever court-martialed.

Grant later said, "General Burnside wanted to put his colored division in front and I believe if he had done so it would have been a success." Nevertheless, in military myth the Battle of the Crater was such a disaster that it cast a general pall over the reputation for bravery that blacks had thus far earned. It was left for General Butler, the first to make use of the "contraband" label, and a man who had once belittled black soldiers for alleged awkwardness in gun handling, to fashion a long-overdue tribute. Fittingly, it came after another battle—at New Market Heights, Virginia. There, after having been ordered to remove the caps from the nipples of their guns so they could not fire them (officers believed that stopping to shoot might slow the momentum of the charge), nine black regiments victoriously stormed a Confederate redoubt at bayonet point, suffering 1,000 casualties.

"In a space not wider than the clerk's desk and three hundred yards long, lay the dead bodies of five hundred and forty-three of my colored comrades," Butler wrote, "and as I looked on their bronzed faces upturned in the shining sun, as if in mute appeal against the wrongs of the country for which they had given their lives, whose flag had only been to them a flag of stripes, on which no star of glory had ever shone for them—feeling I had wronged them in the past, I swore to myself a solemn oath . . . 'to defend the rights of

In full dress, complete with brass shoulder scales, men of Company E 4th U.S. Colored Infantry stand at ease at Fort Lincoln, near Bladensburg, Maryland, which was part of the defenses for Washington, D.C.

those men who have given their blood for me and my country that day and for their race forever.' "

Before 1864 was out, the all-black XXV Army Corps was formed. The largest black unit ever in American military history, it was commanded by Gen. Godfrey Weitzel who, as a lieutenant, had asked to be relieved of an expedition with black troops because he thought leading them into the South would stir bloody slave insurrections. In the black corps hopes ran high of playing a major role in the spring campaign of 1865 that would end by vanquishing Lee. But then the XXV Corps was dismantled. Divisions were split off, brigades scattered, regiments ordered to temporary duty with white units, the corps' command fragmented and removed to secondary rear echelons. Grant already had 110,000 men in the field to Lee's 50,000. But with some justice, a member of the corps lamented bitterly, "It was clearly not intended that the colored troops should win any glory. . . ."

On the great day when Union troops finally marched into the Confederate capital at war's end, they were led by black detachments from the XXV Corps. A Chicago *Tribune* editorialist reflected on the encouraging fact that representatives of a formerly enslaved race "bore the banner of freedom" into the birthplace of the rebellion. But he also rhapsodized about "sable warriors . . . rolling up the whites of their visual orbs, and exhibiting an untarnished display of nature's dentistry" as they entered Richmond. Immediately thereafter, wonder of wonders, the XXV Corps was reconstituted—and shipped to the Texas border with Mexico. Grant's order left little doubt what fate awaited them there: "You should take a fair quantity of intrenching tools. . . ."

Some 180,000 black soldiers served in the Union Army, about 10 percent of its total strength; 2,800 were killed in battle, 34,000 died of disease in the field and 21 were awarded the Medal of Honor for bravery.

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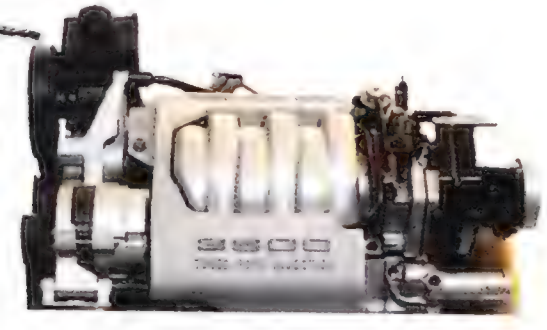

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By Helen Dudar

In turn-of-the-century Paris, an explosion of brash new art

Museum of Fine Arts, Houston

Dubbed 'les Fauves' *(the wild beasts) for their uninhibited use of color, these artists boldly rearranged the imagery of nature*

The scandal of the Parisian art world in 1905 was Room VII of the third annual Salon d'Automne in the Grand Palais, its walls throbbing with raw color. Color squeezed straight out of tubes; color assaulting the eye and senses; color that sometimes seemed to have been flung upon the canvas; color that dared to tint human flesh pea green and tree trunks a violent red; color that not only refused to imitate nature but actually had been used to suggest form and depth.

The signatures on the paintings bore the names of men some of whom, surviving notoriety, would soon be more or less famous. Henri Matisse, the oldest of them and the unlikely center of this radical new style, would flourish into his 85th year as one of the masters of our century. André Derain would, for a time, produce works of breathtaking originality and virtuosity. Albert Marquet and Henri Manguin, less than household names in our day, would be the best-sellers of the group because they turned out tamer work that was gentler to the untutored eye. Maurice de Vlaminck, a larger-than-life figure and a devout fabulist, would claim with some exaggeration that he was really the first to engage with the new style, and then, the first to abandon it.

Seminal moments of this sort are prey to myth. By one account, possibly apocryphal, one of the organizers of the big show—1,625 works in all—decided to group most of the high-color pictures in a single room for the sake of consistency. (And possibly even in the interests of commerce; the public came to the annual salons of Paris not only to inspect work offered by artists, but also to gossip and gasp over the excesses, and occasionally to buy a picture.) If, instead of being concentrated in one room, the paintings had been scattered through the hall, we would still have had the first group revolutionary statement of art in the 20th century. But would anyone have thought to call its practitioners *les Fauves*?

The label was the gift of Louis Vauxcelles, art critic for the daily newspaper *Gil Blas* and a reasonably sympathetic audience for avant-garde work. Naturally there are several versions of the baptism, but Matisse's seems as plausible as any. As the artist later told the story, Vauxcelles walked into Room VII, spotted a marble neo-Renaissance bust of a child surrounded by the carnival of colors blazing on the walls, and wisecracked, "Donatello amid the wild beasts [*les fauves*]." Vauxcelles was so pleased with the line that he repeated a slightly modified version in his review.

Legend, lore, remembrance and a Fauve feast for

"... the problem is to group forms in light," wrote André Derain of *Turning Road, L'Estaque*, painted in 1906.

the eyes come to us this year from the Los Angeles County Museum of Art (LACMA) with "The Fauve Landscape: Matisse, Derain, Braque and Their Circle, 1904-1908." Said to be the largest international loan show of Fauve art ever mounted and the first to concentrate on outdoor vistas, it will have 175 works assembled from collections all over the world. The exhibition will be at LACMA from October 4 through December 30 and then move on to the Metropolitan Museum of Art in New York from February 19 to May 5, 1991. Completing the tour, a reduced version will be shown at the Royal Academy of Arts in London from June 10 to September 1. Support for the show has been provided through a grant from the Ford Motor Company, with additional funding from the National Endowment for the Arts.

Stedelijk Museum, Amsterdam

Admirer of Van Gogh, "whom I loved more than my own father," Maurice de Vlaminck was himself admired by Fauve master Henri Matisse. He did *Landscape near Chatou* in 1906 at height of group's enthusiasm.

As it is used in this show, landscape is a broad territory embracing any kind of open-air setting that caught the artists' imaginations. Most of the Fauves were, if not obsessed by outdoor vistas, then certainly unashamedly preoccupied with them. They seemed compelled to set up easels in sunlight and within sight of the real thing—at commanding stretches of country roads and factory towns and city rivers and coasts and beaches—in order to rearrange the imagery and violate the natural colors.

Their work represents an odd time in modern art history. It is generally agreed that the Fauves were not really a school and not quite a movement. Most of the artists were friends—or at least more than nodding acquaintances—and painted side by side in a succession of pastoral or urban settings, but they cannot be said to have formulated a doctrine of common purpose. Fauvism appears to have just *happened* in an almost coincidental fashion. And it happened at a nervous moment when a new, venturesome spirit was wanted, when questing figures who were becoming artists had to find a way out of the 19th century, a leap beyond the academy, well beyond both the sunny warmth of Impressionism and the Postimpressionist shocks of Cézanne, Van Gogh and Gauguin.

Few radical moments in art have had so brief a life span or have faded so swiftly into the shadows of memory. Given the fevered intensity of the style, burnout seemed inevitable. Georges Braque, who came late to Fauvism and left early, had a reasonable rationale for its swift decline. "You can't remain forever in a state of paroxysm," he explained. Moreover, the pursuit of the new that followed Fauvism—the unnerving plunge into Cubism, the spin into Futurism, the dazzle of Dada and then Surrealism—seized the public audience for art so completely that years slipped by before any serious notice was applied to that first, once-shocking moment in the infancy of modern painting.

Mr. and Mrs. Jean-Pierre Manguin, Avignon

Henri Manguin found St. Tropez an "ideal" place and painted this sunset scene there in autumn 1904.

A radiant celebration of color

To our eyes, the pictures it produced are a joy, a radiant celebration of color. On the other hand, the studies of the times that produced them have always been in slight disarray; hardly anybody seems to agree, for example, on questions of who were true believers and for how long. Judi Freeman, LACMA's associate curator of 20th-century art, who organized the show, is surveying the period through the work of 11 artists, only some of whom were on display in Room VII on that October day.

Actually, the catalog covers 12 artists, but the work of one, Jean Puy, is not in the show at all because, Fauvist though he may have been, landscape did not attract him. Also among the missing is Georges Rouault, who has turned up in other Fauve shows but whose Fauvism is in dispute in some quarters, and who, at all events, did not paint landscapes in the period Freeman is surveying. On the other hand, there are two paintings by Louis Valtat and one by the Dutchman Kees van Dongen, both of whom are sometimes dismissed as mere fringe Fauves.

Surprisingly, the exhibition is dominated by Derain, who is represented by more paintings than Matisse. Freeman is playing favorites here: she has come to consider Derain "the quintessential Fauve," to believe that, more than any other painter of the time, he knew every inch of the territory and summarized it in one picture or another. During the summer of 1905, Matisse and Derain set up their easels side by side in Collioure and together explored the sunwashed vistas of the South of France. But, as Freeman observes and Matisse himself confessed, his consuming interest was really the human figure. Still, in his own time, it was Matisse who was seen as the pivotal artist among *les jeunes*, the generation that came of age in the last decade of the past century. Absent an ideology, he never quite articulated the quality of the new art until he had abandoned it, and then it was largely to disparage it. The year Fauvism expired, Matisse

looked back at the recent past and recalled, "There was a time when I never left my paintings hanging on the wall because they reminded me of moments of overexcitement."

Nothing came easily to him in those days. He was so tormented by the problems of making art—what to paint, how to achieve a measure of originality—that he once wrote to his friend and old schoolmate Manguin, "I believe that painting will make me crazy and I am going to try to get out of it as soon as possible."

Matisse had come late to art after abandoning law studies, and he was an altogether unlikely figure to lead an army of avant-gardists, a neat, reserved, rather sober, professorial man whose colleagues referred to him with affectionate mockery as "*le Docteur.*" He was already in his 30s when he and his fellow *jeunes*, most under the age of 30, shook the art world at the Salon d'Automne. Some of them were old friends: Marquet, Manguin, Puy and Camoin had painted alongside him ten years earlier as students at the Paris atelier of Gustave Moreau, whose own style was interestingly if conventionally romantic, but who never discouraged his pupils from unconventionality.

If Matisse was the sturdy bourgeois gentleman, Vlaminck was the polar opposite, a raw, outsize personality with outsize appetites, a cartoon figure of the stereotypical artist. "He painted as other men throw bombs," one critic has commented. He also taught boxing, played the violin in sleazy cafés in his youth, wrote soft-core hack novels and, to compensate for the starved days of his youth, could enthusiastically consume lamb by the leg. Vlaminck and Derain, a young man of surpassing intelligence, lived in the Paris suburb of Chatou and discovered each other when the train carrying them between the city and their town was stalled by a derailment. It is typical of Vlaminck's inflamed imagination that he later wrote vividly of the awful carnage at the scene, although contemporary newspaper accounts reported no deaths at all.

Matisse first met Derain in an art workshop in Paris and in 1901 ran into him in the company of Vlaminck at a major Van Gogh retrospective. That show, a full-scale encounter with emotionally explosive color and brush strokes, was one of the events that would shape the generation on the brink of inventing Fauvism. As Vlaminck, with characteristic melodrama, would later describe the power of those pictures, "I was so moved, I wanted to cry with joy and despair. On that day I loved Van Gogh more than my own father."

Friendship among the three artists did not really begin until four years later, when Matisse came to visit

Helen Dudar wrote about Sigmund Freud as collector in August. She wrote about Jasper Johns in the June issue and about the art of John Marin in February.

A 1906 postcard shows fishing boats in Collioure, a Mediterranean town that was favored by some Fauves.

the studio that the two younger men shared in Chatou. For several years, Matisse had been applying color to canvas in an unorthodox fashion, and some of these unorthodox pieces had been seen by 1904; still, he was thunderstruck by Vlaminck's wild use of raw tints. As he recounted the impact, "I couldn't sleep last night."

The other influential group of artists involved in the short season of Fauvism was the Le Havre circle, three men from the Normandy Coast whose childhood friendship continued into adulthood: Georges Braque, Raoul Dufy and Othon Friesz. Dufy saw an important Matisse piece at the 1905 Salon des Indépendants, the big spring Parisian annual, and was literally jolted out of his timid Impressionist style. The other two also appear to have been converted that year at the same salon. Braque and Dufy would each become famous far beyond the boundaries of France for work of very different kinds, but Friesz suffered an oddly stunted reputation. A sample of his art is to be found in every provincial museum in France as well as in collections in other parts of Europe, but he is seldom seen and hardly known in the United States.

Braque and Dufy were not part of that epochal 1905 autumn salon, however. Also missing was the President of France, Emile Loubet, whose ceremonial duties included presiding over the openings of cultural events of this kind; he passed up the show apparently upon learning that it harbored the seeds of scandal. In the daily and weekly journals of the day, the critical response to Room VII ranged from friendly understanding to enthusiastic abuse. One review dismissed the pictures as mere "daubs"; another saw them as either "raving madness or a bad joke"; a third compared them to "the naive and brutal efforts of a child playing with its paintbox."

Hermitage Museum, Leningrad

When Matisse visited the town in summer 1905, he painted *View of Collioure*, interpreting the scene in his own inimitable way. He wrote to encourage his friends to join him there, and Derain soon followed.

As for the reaction of the general public, the best account we have is from an American who did not get around to checking out the Fauves until 1908, when the style was pretty well exhausted, and who wrote an article, "The Wild Men of Paris," which did not see print here until 1910. The piece has become an important little document in Fauve history because the author, Gelett Burgess, ran around Paris and, feeble though his French was, actually interviewed some major figures: Matisse, Derain, Braque, Friesz, "all young, all virile, all enthusiastic . . . and all a little mad." Among "the wild beasts" he mistakenly included the young Picasso, clearly a rising star but one who had never dipped a brush into Fauvism.

Burgess was a writer, an illustrator and, it may be useful to remember, a humorist. He describes stepping into the hall that housed the Salon des Indépendants that spring to be assaulted by "shrieks of laughter coming from an adjoining wing." He tells of seeing spectators "lurching hysterically in and out of the galleries." He tells of his own shock upon encountering this strange new world, "a universe of ugliness."

Still, despite the philistine mockery, the Fauve spirit caught on in small, important ways. Pictures sold for modest sums. There were shows, notably in Montmartre in the small space operated by the redoubtable little Berthe Weill and at Ambrose Vollard's gallery, which in 1904 had given Matisse his first one-man show. A few years later, Vollard bought up the contents of the Derain and Vlaminck studios for sums that were undeniable bargains even then. The Steins, Gertrude and her brother, Leo, lately settled in Paris, became patrons of Matisse. Two wealthy Russians with highly developed tastes in modern art, Sergei Shchukin and

Private collection, Switzerland

After Derain joined Matisse in Collioure in 1905, he made this painting of the fishing port. "Above all, the light," he wrote. "A golden hue that suppresses the shadows." Later: "Colors became charges of dynamite."

Ivan Morosov, came calling and carried examples of these strange new paintings home to Moscow.

Assembling an exhibition on the scale of the Los Angeles show becomes an exercise not only in stamina but in detective work. Judi Freeman spent the better part of three years tracking down paintings from collections here, in Europe, the Soviet Union, Israel and Japan. She interviewed the aged surviving children and other relatives of some of the artists, and made translations of letters, many unpublished, that the Fauves had written one another.

One of the principal concerns that drove Freeman was hunting down the subjects that the artists had chosen to paint. This is not always easy after eight decades have gone by. Almost anyone who could scrape together a few francs seemed bent on finding some striking place to paint during the warm months. Matisse spent the summer of 1904 in St. Tropez as a guest of the Pointillist artist Paul Signac. Manguin found a house nearby in Cavalière, and Marquet stayed in a hotel in Menton to the east. In other years, Matisse chose Collioure, farther down the coast toward Spain; one summer Derain joined him there. Friesz took himself off to Antwerp. Derain invested a season in L'Estaque, which had provided Cézanne with some of his splendid subjects. Another year, Derain and Dufy settled in together at Le Havre and wandered along the Normandy Coast, discovering vistas worth celebrating in oil. Vlaminck stayed home and painted bridges and, since he was notoriously casual about giving his pictures either titles or dates, the pictures were almost invariably labeled "*paysage*" ("landscape") on the back and invariably titled *The Bridge at Chatou* for exhibition. Exploring the Seine as it meandered through the northern suburbs of Paris, art historian John Klein came to realize that often the picture titled *The Bridge at Chatou* was actually the bridge at the nearby towns of Le Pecq or Bezons or Argenteuil.

In her search for sources for the paintings, Freeman scoured flea markets and antique fairs in France for

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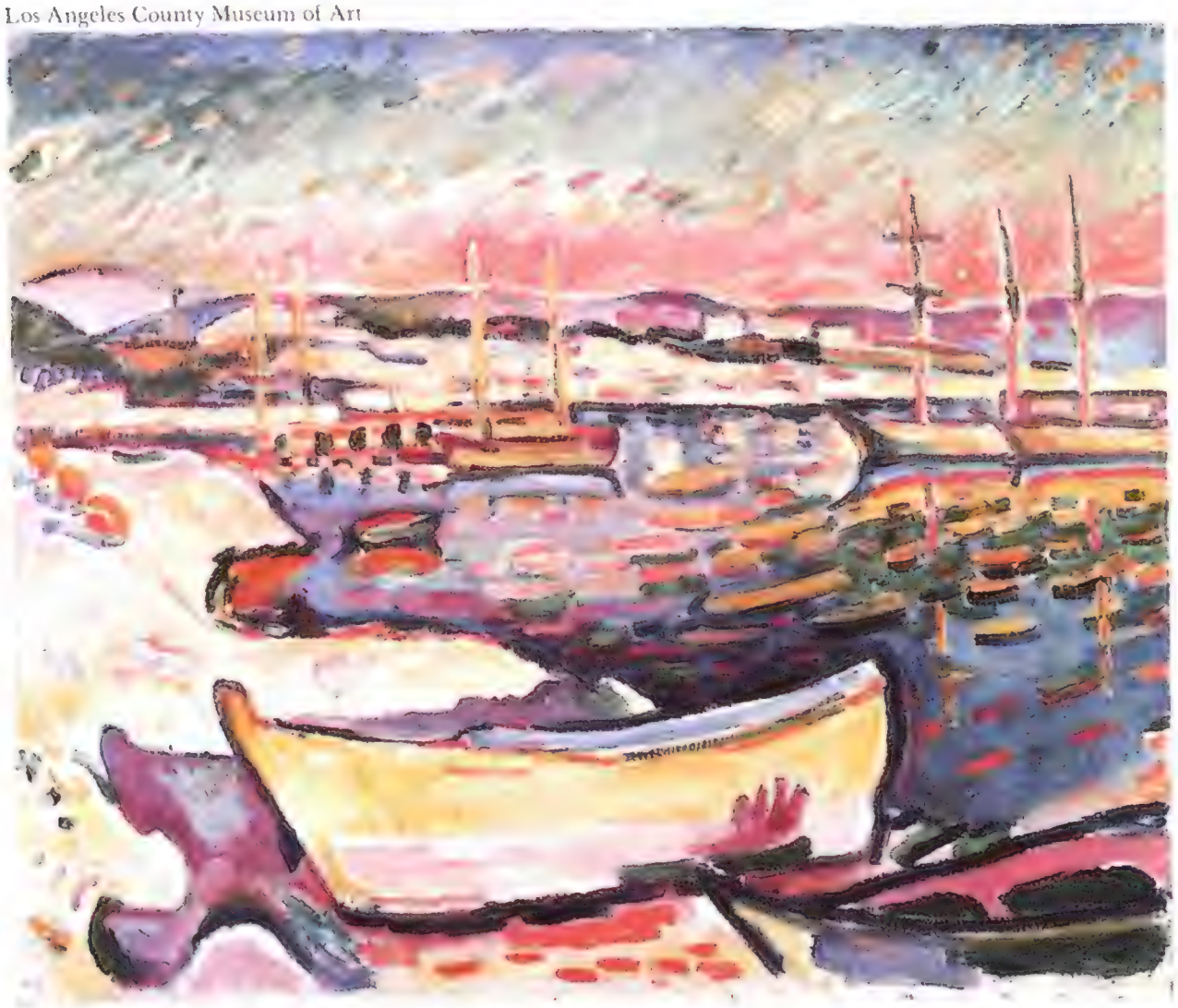
very old postcards of vacation towns. Matching a photograph to a painting is not always easy. Buildings burn down or are torn down to make way for something modern; war changes the contours of a harbor as German bombing did in St. Tropez. In some communities, Freeman would march into the *mairie* and ask for the name of the oldest historian in the region; she was frequently lucky enough to be directed to a 70- or 80-year-old resident who could remember some vanished structure in a painting and sometimes knew what business or family it had sheltered. More than the academic's obligatory burrowings were involved in this search, and more than the fact that she wanted to organize the exhibition around major sites. For the unpracticed viewer as well as the professional, there is surely special pleasure to be taken from a picture by looking at the original subject and understanding how the artist has recomposed it.

Naturally, the exhibition is accompanied by a large catalog with reproductions of paintings and with essays by important authorities, but the most absorbing stretch of material may well be Freeman's 63-page chronology of the period. The entries are something like diary jottings except they cover the comings and goings of a small company of people who made or bought or sold art or passed judgment on it during those years; there is something touching about reading often-ordinary details of the lives of extraordinary men. They sent postcards complaining about the bad weather; they borrowed small sums of money and struggled to pay back debts; they worried about not producing enough pictures during an expensive season in the sun; they discussed their own and their colleagues' periodic crises over painting. Henri-Edmond Cross, the Pointillist artist, encountered Matisse in St. Tropez at Signac's villa in 1904 and wrote to a friend, sadly reporting on "Matisse the anxious one, the madly anxious one."

Judi Freeman brings the curtain down on Fauvism with the major group shows of 1908, although it can be argued that the end of that brief blaze of modern art came at earlier and later times for different artists. The causes were myriad. They included a change in the way Matisse himself had begun to paint; a fresh look at the late work of Cézanne; the discovery and impact of tribal arts; and the large shadow cast by that fiercely talented émigré from Spain, Picasso.

In 1906, Matisse had exhibited the astonishing *Joy of Life*, a landscape study of fleshy, female nude bathers arranged in arabesques that could be seen as an abstract composition and, indeed, would be seen as an ancestor to abstract art. Suddenly, in the salons the following year, along with scenic views, everybody seemed to have been busy painting nude women in

Los Angeles County Museum of Art



L'Estaque, an industrial suburb of Marseille, was another favorite haunt of painters. Georges Braque created the vibrant scene *Boats on the Beach* when he visited in late 1906.

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During the summer of 1906 Braque went to Belgium with his friend Othon Friesz, and in Antwerp the two artists painted side by side. In his *Port of Antwerp*, Friesz rendered the maritime vista in subdued colors.

outdoor settings. Even Vlaminck succumbed, although as a figure painter he was genuinely untalented. Almost as telling was the fact that the colors in some of the later work of the Fauves were shaded down to something approaching natural tones, and often, the figures were actually modeled.

Cézanne, who died in 1906, was hardly unappreciated by the next generation of artists. In 1899, at a time when every centime counted, the young Matisse had managed to buy one of Cézanne's "Bathers" series, a painting he treasured all his life. But major retrospectives in 1904 and 1907 had focused new attention on the subtly geometrical way in which Cézanne had organized his landscapes. There was a kind of geometry, as well, to the highly stylized African carvings that a few of the artists suddenly found worth buying and studying. Indeed, it was Matisse who is supposed to have introduced Picasso to African sculpture. Not long after this event, in mid-1907, Picasso began working on a strange picture of three women he called *Les Demoiselles d'Avignon*, a piece that took some of its inspiration from tribal art and added a new dimension to painting: time.

When he first saw *Les Demoiselles* later that year, Braque was shaken. "It is like drinking kerosene in order to spit fire," he said. Within a few weeks, he was working on paintings in a similar style. Matisse, who could be alternately generous and unkind to his artist friends, was repelled. The following fall, he voted with the majority of the jury that rejected most of Braque's submissions to the 1908 salon. Chatting with Vauxcelles, he disparagingly reported that Braque had begun composing pictures of nothing but "little cubes," and the *Gil Blas* critic who had already named one style was

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Albert Marquet and Raoul Dufy painted together in Normandy in 1906, where they stopped at different places to set up their easels. In Trouville, the colorful posters attracted Marquet.

in a position to confer a label on another: it was he who broke the news of Braque's "*bizarreries cubiques*" to the public.

Cubism was suddenly the fever center of a modern movement; the brilliant Picasso-Braque collaborative friendship was launched, and Picasso was clearly crown prince, if not yet emperor, of the modern art world.

The middle-aged Matisse, no longer the leader of an avant-garde circle, abandoned Paris for its suburbs. The year that Fauvism became history, his palette was less fiery, and he knew he wanted to produce pictures of a different kind, pictures that offered a balm for the spirit. "What I dream of," he wrote in an important 1908 essay, "is an art of balance, of purity and serenity, devoid of troubling or depressing subject matter, an art which could be . . . a soothing, calming influence on the mind, something like a good armchair. . . ."

A kind of holy anxiety seemed to have compelled Matisse to renew his imagination; with his defection from Fauvism came a stream of poetic, vibrantly decorative pieces. But of his friends and followers it has been argued that some of them never again made paintings that approached the quality of their days as "the wild beasts."

Derain briefly climbed aboard the Picasso Cubist wagon. What was wrong with Fauvism, he would later insist, was "a kind of fear of imitating life." Only a few years before, at Vollard's urging and with the dealer's help, he had traveled to England in hopes of repeating Monet's great success with a series of London paintings and had produced several dozen pictures that are still wonders to encounter. Later, in flight from his Fauve past, he turned his back on modernism. Derain's paintings after the 1920s were often quite dazzling pastiches—reflections of an infatuation with the many Old Masters who had seized his imagination.

Dufy also flirted briefly with Cubism before finding his way to a facile calligraphic style described by one critic as "pretty furniture pictures." Vlaminck once said that one of the reasons he abandoned Fauvism was a fear that he was in danger of "lapsing into mere decoration." Instead, he lapsed into formula, filling canvases with thickly painted views of country roads lined with picturesque cottages and shadowed by dark, brooding skies. He had promised himself, and was fairly faithful to the vow, never to use anything but heavy browns and dirty yellows. It was as if the hot, bright flame that had fired up a lustrous moment in modern art had become a danger, and the daring company of men once thrilled by the light were compelled to cool it down with mud.

Dufy's *Boats at L'Estaque*, done in 1908, shifts away from intense colors and inward toward the abstract.

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By Stephen J. Bodio

Pigeon racing: homing in on an 'invisible' sport

But the pigeons' uncanny ability to make fast return flights is only one of many qualities these extraordinary, worldwide birds display

The first thing you must understand about a long-distance pigeon race is that most of it is invisible. Is this true of any other sport? Before the sudden appearance of the bird on the landing board—or, if you are very observant, in the sky—the bird performs its mysterious art over a course of from 8 to 600 or so miles. All you do is ship the bird and then wait for it to come back. From the time that I was 9, until I was about 14, I spent more Saturdays (and Sundays, if the race covered more than 400 miles) waiting for my father's pigeons than in almost any other activity. Since release was at dawn, I didn't have to be ready and waiting for their return *too* early. But regardless of how I started the day, I'd be out there sitting in my chair on the grass facing the loft at least an hour before any bird was due.

I don't want to make it sound like a chore. I was always excited about birds—all birds and any birds. I would lie on my back on the chaise longue, staring straight up into the blue until my eyes filled with transparent drifting flecks. I saw my first hawks then: soaring buteos. Sometimes they were so high up that at first I wasn't sure if they were birds or insects. On days of changing weather, gulls would meander across the sky in twos and threes, swallows played in the middle levels, dipping and swerving and diving like miniature falcons, hunting insects. Parties of chimney swifts screamed around on invisible racetracks. Sometimes a pair of crows would climb toward the serenely revolving hawk, cawing defiance; or a robin would bounce down to the lawn; or an oriole chase from the

As dawn moves slowly westward around the waking world, pigeon flocks take to the air all over the globe.

Here a city fancier waves flag to signal his tame squadrons that it is time to return to their rooftop coop. Pigeons are unique: kept in close quarters, they can yet fly freely and safely in a modern city.

Illustrations by Arthur Shilstone

tall willow to harass the crows; or a bluejay alight on the roof of the loft, to look around and then hurry back to the woods behind.

Sometimes the waiting was as real as hunger. Completely attentive, I'd see the bird in the air. Flapping hard, it would come in low over the roof, rocking a little in the air, then braking and flaring just above the loft's roof. If a bird came in this way, you didn't have to coax it; it would hustle down the slant of the roof and thrust itself through the "trap" entrance with an audible thud. But if a bird came in high, it would circle maddeningly, then maybe alight on the house before it flew to the loft, pranced around on the loft roof, or got hung up on the landing board to stare through the trap, the locking door that would momentarily immobilize birds so we could check them in after removing their racing bands, or "countermarks."

Meanwhile I'd be going crazy. Races are lost by seconds, but the silly bird would just be sitting there! If my father was at home things weren't quite as bad, but when I was alone I felt the weight of responsibility. I'd rattle the feed can, sure; I'd also whistle, walk forward, freeze if the bird raised its head to stare at me, pray and almost cry. Come on!

Finally, the bird would drop, its forward movement arrested. I'd reach up to where its legs were exposed, pull the countermark, fumble it into a capsule, pop the capsule into the timing clock and turn the handle. The solid clunk as the mechanism recorded the time let me start breathing again. Now the pressure was off. The rest of the birds would be more fun.

The dusty scent of pigeon feathers

In contrast with the endless waiting of the race day, when you sit alone and imagine what your bird is seeing, shipping the birds to a distant release point is a bustling, social activity. In the '50s my father belonged to the Dorchester Homing Pigeon Club, which met in and shipped from a garage in a blue-collar part of Milton, Massachusetts. For a child, the little room was a slightly intimidating but magical place, hot and stuffy in the summer dusk, redolent of beer and cigarettes, Parodi cigars and cedar shavings, and the dusty scent of pigeon feathers.

Each fancier brought his baskets, filled with shifting masses of birds that milled and fought and uttered rolling coos as they pecked at their neighbors. He would take his birds out, one by one, holding each aloft to murmured approval or friendly jeers as the secretary recorded its permanent band number. He would then extend the bird's other foot toward a machine like a metal spider that would snap a numbered rubber ring, the countermark, onto the bare leg. The owner handed the bird over to be packed, with hundreds of others, in transport crates for loading onto a truck with birds from the other Boston clubs, and driven to locations as near as Gardiner, Massachusetts, in an 80-mile race, or as far as Sandusky, Ohio, 600 miles away.

Then came the technical part, frustrating to me as a child and perhaps to you as a reader, but necessary in order to understand this strangest of all kinds of racing. After the birds were safely packed away, every racer set his clock—an expensive six- or ten-inch-square box of wood or metal, imported from Germany or Belgium—and started it. The club officials wired the clocks shut and secured the wires with soft lead seals. On the next morning each racer would check his clock against the master clock of the Concourse, an umbrella organization for all the clubs included in the race, to insure that every clock was running at the same speed and that no one had an accidental advantage.

In the top of each clock was a hole big enough to admit a capsule about the size of the top joint of your

Island-hopping Hawaiian pigeons fly straight to destination aided by a number of navigational clues.

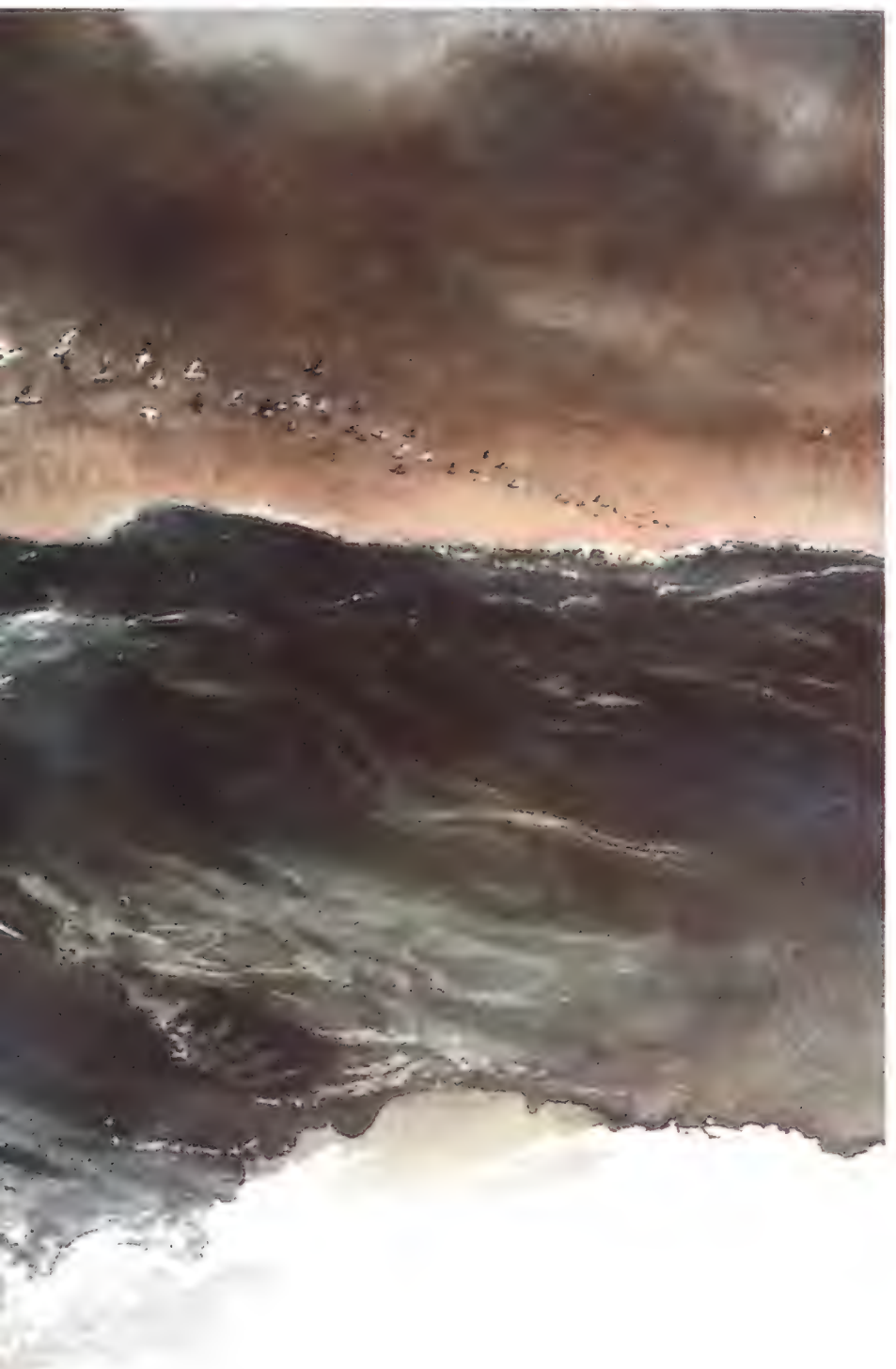
index finger. Below it revolved a wheel edged with receptacles for two dozen or so of these capsules. As your winged racers returned, as already described, you would catch them, remove their countermarks and put each in a capsule, drop the capsule into the clock and turn a large key stuck in the top, "punching it in" with a reassuring clunk. The exact second that the bird arrived was then recorded on a roll of paper beneath one of the clock's windows, enabling race authorities to compute the bird's speed in yards per minute. As your exact distance (in yards) from the release point had already been plotted by a committee of surveyors using geographical quads, the fastest bird won—rather than the first one home—a necessity in the only race where every contestant "runs" a slightly different course.

Traveling across the world at well over 40 miles per hour, what must these lone fliers feel? The wind, sure; the beat of wings, the rise and fall and turn and skid, the glide and dizzying fall. Still, a pigeon's world-view—its *Umwelt*, as the German professors of animal behavior would have it—contains much that is absolutely alien to humans essentially earthbound within a certain narrow band of senses. With the help of scientists, however, fanciers have begun to understand the pigeons' senses. But long before they understood their birds, they observed and worked with them.

Basically pigeons are rock doves, originally from the Middle East. They have always "homed," and this characteristic, together with the birds' fecundity and genetic plasticity, earned them an early niche in human society—perhaps an earlier one than the chicken's. Pigeons lived on farms and in towns, were eaten, played roles in sport and war and communication. It might not be too much to say that human imagination first navigated the air on the wings of pigeons.

Every pigeon-fancier's global imagination still does. Sitting here in New Mexico, I know that as the line of dawn advances around the world, men on other rooftops have sent out their sky probes. In Diyarbakir, Turkey, nine hours before I rise, some townsman sends aloft Syrian dewlaps, handsome horse-headed birds almost as big as peregrine falcons, coal black with white wingtips and forehead blazes. After watching them fly wing to wing for a half-hour, 5,000 feet above, he tosses a fat white bird out onto his roof—as a return signal. Instantly the dewlaps fold and fall headfirst, cleaving the air like hawks. They are "divers," birds bred for falconlike stoops, and they accelerate toward the loft without a flutter, only corkscrewing a little from the resistance of the solid air on their half-folded wings. Ten feet above the ground, just as it seems they must smash against the loft, they unfurl, brake with heavy flaps and flutter through the open doors of their master's "cupboard loft," where they begin to peck up their morning ration.

Untroubled by cloudy skies and stormy seas, birds can somehow plot correct course while far from land.



Seducing females from rival lofts

A little later, at the other end of the Mediterranean, in a village near Seville, an old fancier tests the wind with his hand on a loft door. He is one of the last breeders of an ancient, and at first sight grotesque, Spanish pigeon known as the "thief" pouter. There are all sorts of pouters, though they all have immense crops that they hold filled with air, often so large and loose that they sag like flabby beer bellies. According to their lineage, they may also have parrot bills, "ram heads," wattles on nose and chin, and eyes circled with bare skin. They are direct descendants of birds brought north into Spain by the Moors around the eighth century, and have been flown for hundreds of years to steal, or seduce, females from rival lofts in a sport so formal and organized that Spanish governments have long regulated it.

Among hundreds of breeds, from top: double-crested trumpeter; Old Dutch capuchine; English pouter; short-faced tumbler; a blue-checkered Chinese owl.

After the 1936 Spanish Civil War, the old breeds nearly disappeared, as modernist fanciers crossed them with speedier, more streamlined Belgian homers. But a few traditionalists, like this old man, knew that the pure ancient breeds (one of the more recent was developed by a Franciscan friar in the late 1700s) had more instinct for seduction, whatever their aerodynamics.

Which are none too great. The old man flies Marcheneros, pouters with short tails they carry splayed out against the air. As one Spanish writer says, a pouter can easily become "a toy for the wind," especially in the strong winds north of the Strait of Gibraltar. But this morning the winds have died down, and the old man releases his little flock. The birds whir up like little helicopters and swing above the buildings into the sun with a sort of heavy joy. Their ridiculous "tile tails" are spread wide, breaking the wind just enough to give their flight an odd buoyancy. They look like nothing else on Earth.

Fifteen hundred miles to the northeast, near Antwerp, stands a line of whitewashed brick buildings with skylights and red-tiled roofs. A Belgian professional breeder paces the walk under the windows, checking his watch and peering over the tops of the trees. It is past the formal racing season, but all through the winter his birds train like Olympic athletes. The young birds have been out on a 12-mile toss, and now, low in over the trees, his yearling fliers—a flock of about 60 birds, culled by nature and human calculation from an initial year's hatch of 200—brake and jostle for space to fly in through their home loft doors. Their wing song changes pitch from the whisper of speeding flight to a clatter and whistle as they peel off from the circling main flock. Unlike American fanciers, most Belgians encourage their birds to fly straight in from the sky, rather than landing on the roof and waddling in through pigeon doors. In the hypercompetitive world of Belgian racing, quite literally split seconds count.

Fish-eyed, crested, tiger-marked fliers

And as dawn's edge moves westward round the waking planet, from Barcelona to Brooklyn, fanciers continue to rise and send up their sky probes. The breeds are different—multicolored Catalonian tumblers in northern Spain, fish-eyed, crested, tiger-marked fliers in Brooklyn. In Hawaii, late-season racers fly low above the heaving seas between the islands, following invisible skymarks, out of sight of land. In Hong Kong, a wealthy Chinese businessman attaches multiple lacquered flutes, carved from bamboo and hardwoods, to the tails of a little group of "bloody-red blue-eyes" and beak-crested pigeons. Some of the flutes seem impossibly intricate, with two large chambers and 18

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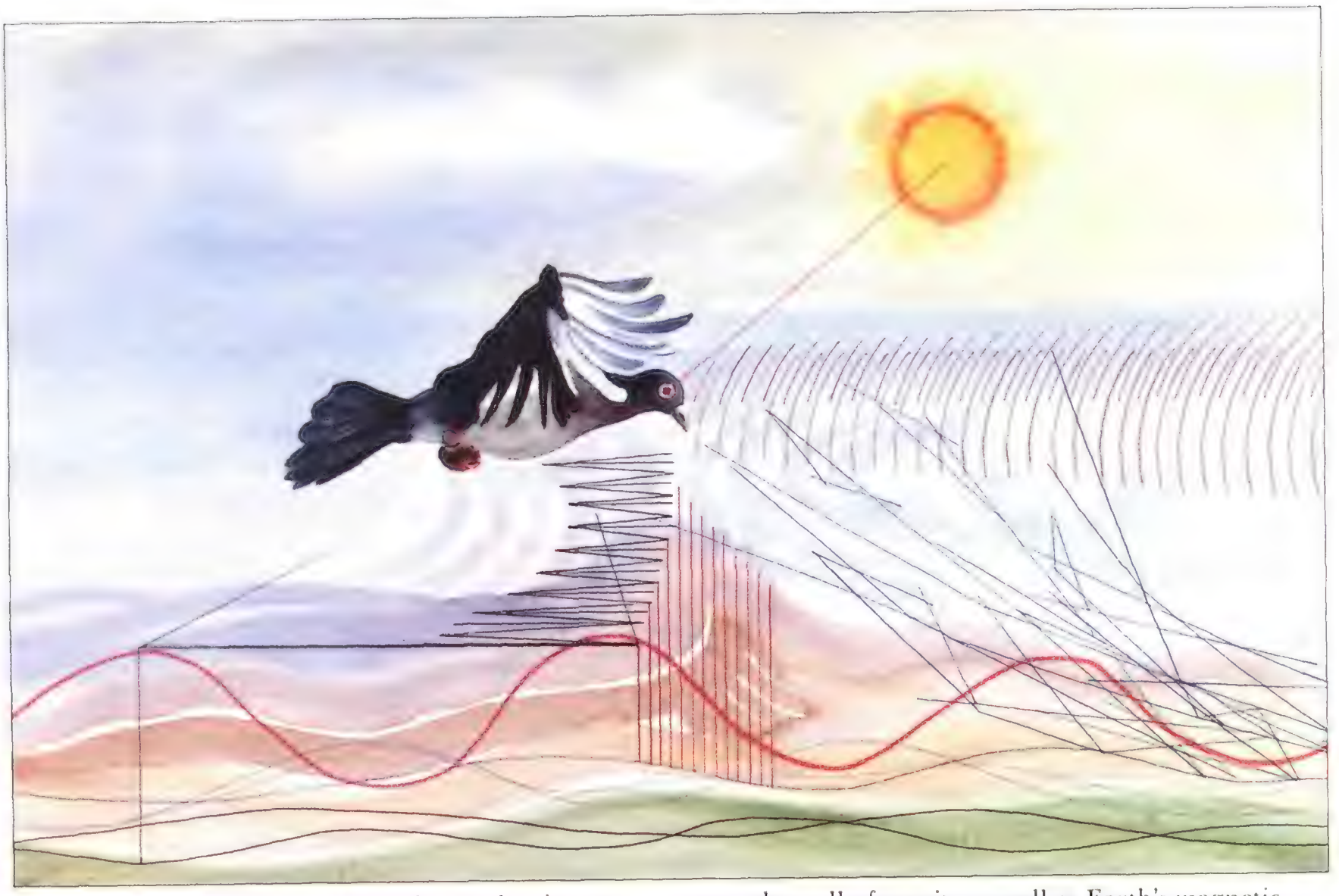

Artist's impression of myriad impulses and points of reference pigeons apparently use in homing: the position of sun and the effect of its ultraviolet rays; the pull of gravity as well as Earth's magnetic field; low-frequency sound waves; the look of the land ahead; eventually, the smell of their home lofts.

small whistles, but the heaviest weighs only three-quarters of an ounce. All were made before the turn of the century and are precious.

The Arab civilization was among the first we have a record of that kept recognizable breeds of pigeons. In any little village in the Middle East you can still see towers of dried mud pierced with hundreds of holes, ancient pigeon slums that may predate the actual villages. The pigeons that inhabit these primitive dovecotes are neither pets nor sporting animals. They may be eaten, but their primary function is to produce fertilizer, which anyone who has seen an old pigeon roost knows they do very well.

A conventional view is that the earliest breeds were military messenger birds, but this is at best only partly true. Many favorite Arabic breeds survive in Spain today, and all the present-day Islamic cultures have fine and venerable pigeons; but many are bred not for homing and racing but to fly in city-roof competitions or for the sport of "stealing" one's competitor's birds (SMITHSONIAN, May 1978). Modern fanciers testing an ancient breed called the Syrian Baghdad have found that it can only return from "short" distances, under 100 miles. In an earlier era of slow transportation and difficult communication such a skill, now commonplace, must have seemed miraculous. But to modern pigeon fliers such birds, compared with the high-tech Belgian racing homers of today, are as a Ford Tri-Motor is to a Boeing 747. By the 19th century in Europe a racer was considered of dubious value if it couldn't return 600 miles in a *day*.

What we think of as the modern world and the modern homing pigeon were both born during wars and uprootings that, from the late 1700s onward, transformed stable old kingdoms into modern nation-states. The flying competitors of pub and village had always carried letters. But from the 18th century on, these fliers became a state-of-the-art communications tool for the expanding armies. War was not the only evolutionary pressure exerted; most breeders were still sportsmen.

As a new social mobility brought together pigeon gene pools that had been isolated for centuries in backcountry villages, the birds were bred to fuse their virtues and cancel out their vices. Farsighted military commanders began to use the best of these new cross-breeds as an avian radio. Pigeons became a serious

Stephen Bodio last wrote for SMITHSONIAN *about falcons (November 1984). This piece was adapted from his new book,* Aloft, *published by Lyons & Burford.*

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In 19th-century England, pigeon racers pitted birds against one another or the clock, as we do today, but their races began when the coachman and pigeons left for the release point, not when the birds were actually turned loose.

instrument of war at about the time of the German siege of Paris in 1870 and remained so until World War II. It is probably no accident that the preeminent breeding crosses were made in Belgium, always one of Europe's prime battlegrounds. But the English, by the early 19th century riding the crest of imperial power, imported each new wave of homing birds.

English fanciers seemed more interested in individual competitors than in the sky-war messengers of the Continentals or the seducers of southern Spain. Against one another or against the clock, sometimes for heavy wagers, Englishmen flew what were known as dragoons, birds that probably originated in a cross of Baghdad types with tumblers. A typical match would begin when a coach carrying a dragoon left an inn, with the coachman charged to release the bird at a predetermined spot. The patrons would place bets on how long it took the bird to fly back.

By the 1860s the swifter and more reliable Belgian homer had become the most popular breed in Great Britain and perhaps the world. Then immigrants brought them to the United States. Even today, racing homers are so ubiquitous in English culture that one of the identifying props used by cockney cartoon character Andy Capp is his basket of pigeons—as clear a part of pub culture as his pint or snooker cue. Nor are homers confined to the lower classes—Queen Elizabeth has her own Royal Lofts.

Since the real homing bird's advent coincided with the rise of applied science in the 1800s, there has never been a shortage of theories about how the birds do it. Charles Darwin's observations of domestic pigeon breeds and breeders gave him a start on understanding the mechanisms of evolution. Most 19th-century discussion centered on whether the birds merely learned landmarks, applying the senses that we all have, or whether they possessed some kind of "sixth sense."

Although scientific study of bird navigation continued after the 1890s, it wasn't until the late 1950s that German researchers observed that migrating robins made use of Earth's magnetic field. In the 1960s, at Cornell, the late William Keeton's research revealed that pigeons indeed use magnetic fields to orient themselves. Italian researcher Floriano Papi, in 1962, through a series of novel experiments, showed that Italian pigeons, at least, enlist their sense of smell to find their way home.

Even so, we still don't know exactly how pigeons navigate. What we have learned is some of the things they can perceive. Pigeons, and perhaps all birds, have a sensory palate so broad and deep it can make a mere human feel deaf, blind, and deprived of his senses of taste and smell (SMITHSONIAN, June 1979). For instance, the birds certainly use the sun as a compass. While we can do this too, for us it is not a hereditary ability. Pigeons can detect the faint electromagnetic field of the Earth. Keeton's research was based on experiments with birds carrying tiny bar magnets. They had trouble homing on overcast days, while birds with pieces of unmagnetized metal that weighed the same were not affected. Pigeons may be able to detect local variations in gravity. They can even hear "infrasound," the low-frequency noise made by wind blowing over a mountain range or by waves on a rocky shore, many hundreds of miles away.

So which of these senses imperceptible to humans do

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they use to navigate? As research piles up in Pisa and at Cornell's ornithology laboratory, it seems that they use all of the above, just as a human might use a map, the sun and memory. If the sun is obscured by clouds, they'll use their magnetic compass, and so on down the line. Although the ability to use such cues is inherent, how the individual bird learns it is important. If a young bird does not spend time outside its loft before its first homing flight, it may never return. According to Cornell's Charles Walcott, pigeons from different locations—even from lofts only one mile apart—apparently rely more on one set of cues than another. If some Italian birds are apparently dependent on sense of smell, Cornell birds sometimes seem to ignore smells completely. The more science shows us of navigation, the more it seems like magic.

When the great evolutionist Charles Darwin first began training his formidable power of analysis on the domestic pigeon, he was already seeking knowledge about why and how life on Earth varies. But breeders engaged in perfecting a single kind of pigeon were looking at just a few bird generations and were too close to their birds to see the larger picture clearly. Darwin's contribution was to show that various extreme types of "modern" breeds were in fact linked together in past generations.

Only a few domestic animals produce as wide a range of physical types as the pigeon: the dog, the chicken and (icthyologists suggest) the goldfish. The pigeon is fecund—four or five broods a year are possible—and has a convenient length of gestation: pigeon eggs hatch in 18 days, the young fledge five weeks later and are sexually mature at 6 months.

Pigeons can be held in close quarters, yet can be flown free in the city. Pigeon owners can choose from any number of roles—doting pet owner, general of a sky army, athletic trainer, genetic sculptor. They can influence natural selection, with the power to change the looks and even habits of a creature in their own lifetimes, steal their neighbor's flocks and seduce his hens—and all this even if they are tied to a few square feet of city rooftop.

The rock doves that all these user-friendly birds are descended from still live in an area that stretches from the Hebrides through the Indian subcontinent and includes large portions of the Central Asian desert and North Africa. Anybody who has ever looked at a city pigeon would recognize the two birds as kin. Rock

A soldier in the French Signal Corps releases one of the many unsung heroes during World War I—a message-carrying pigeon. Trailers such as this one, which could house up to 100 birds near the front lines, were also used in the war by the U.S. Army.

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doves wheel in flocks around bare cliffs the way city pigeons do around skyscrapers. Most are blue-gray with white rumps and two black bars on each wing, the pattern that pigeon fanciers call "blue bar." They build loose nests on ledges in which they lay two chalky-white eggs, brooded by the male during the day, the female at night.

It is upon such a base that fanciers for thousands of years have "built" the various breeds, selected for their flight skill, color or shape, as each breeder's creative impulses took flight. The reasons for certain variations are apparent if you study behavior and appearance. Pouters, for instance, especially the primitive Spanish breeds, are caricatures of macho pigeon sexuality. The males are constantly and aggressively on the lookout for females. Here natural and human selection converge; it's not hard to imagine some ancient fancier noticing that the odd pigeon with the large crop was more than usually successful in bringing home mates, and therefore breeding from him in order to increase his collection—or his larder.

It's easy to see why "squabbing" breeds—those bred to be good eating—have come to resemble small chickens in shape and size, or why pigeons of exceptionally brilliant color and pattern, like Oriental frills or the many German toy breeds or the fantail, would be saved and developed for sheer beauty. Whatever their origins, centuries of whim, will and obsession have given us hundreds of breeds, ranging from six ounces to three and a half pounds in weight (think of the Mexican Chihuahua and the St. Bernard). There are birds that fly a thousand miles to home, and birds that will circle for 24 hours above the loft, and birds that can't fly at all but only turn somersaults each time they leave the ground.

When I was a child, I loved pigeons with an uncomplicated and unselfconscious love. In that labyrinth of preconscious choices that can point the way to a life's passion, direction, even work, pigeons and their owners played one of the two or three determining roles. With a few other birds, they fed my "biophilia" and penchant for animal keeping to the point that I almost became a zoologist. And I still write more often about animals than about any other subject. Figuring out their tracks in the sky first exercised my scientific imagination, as I tried to discover ways to get inside their senses and to test my theories. And even better, for me pigeons linked the science and romance of journeys, so that I could never find biology dry or abstract. Subtly, they influenced the way I would spend at least some of my hours for the rest of my life, in collecting and in breeding animals—not just pigeons but dogs, fish, snakes and hawks.

For some years I was absorbed by hawks. But my early pigeon infection was deep. And never cured. In recent years, as I came back to pigeons again, I found that I could trace their influences through my life, both backward and now forward. They lead me into research into the old Mediterranean cultures that form half my own background. They have, finally, led me back to Darwin's *Variation*, which I bought and read for the first time in 20 years, and so let me be a genetic sculptor, a breeder. I am, I admit, one of that breed of maniacs who lifts up sitting mother birds three times a day to see if the babies have feathers yet.

My first animals, my "perennial retainers" as Konrad Lorenz called his jackdaws, pigeons continue to stoke the fires of my fascination with life on Earth in all its diversity, all the incredible multiplicity of its adaptations. Pigeon flying still seems to me as true a sport as falconry, as rich in tradition and even more multifaceted.

It's evening. I hear a few young squeakers in the walled yard piping from their nests. I can just make out a couple of adolescents preening by the feed trays. A little pack of homers zips by on an aerial racetrack, though nothing pursues. Two pouters pay court to an indifferent young homer, too young to even know what sex it is. Down toward the village, two miles away and a few hundred feet below, I see wings. It's one of the older Spanish pouters, returning. In a minute he pitches up to the roof to join the group serenading the youngster. The homers are still circling. A single sunbeam pierces the clouds to tint them red-gold. I drag my coffee can through the feed barrel to fill it, and begin to shake it, whistling, calling in my birds the way I have since I was 9. The pigeons are flying.

Lofts are subdivided for breeding and nesting; new lofts need powdered droppings to make them "homey."

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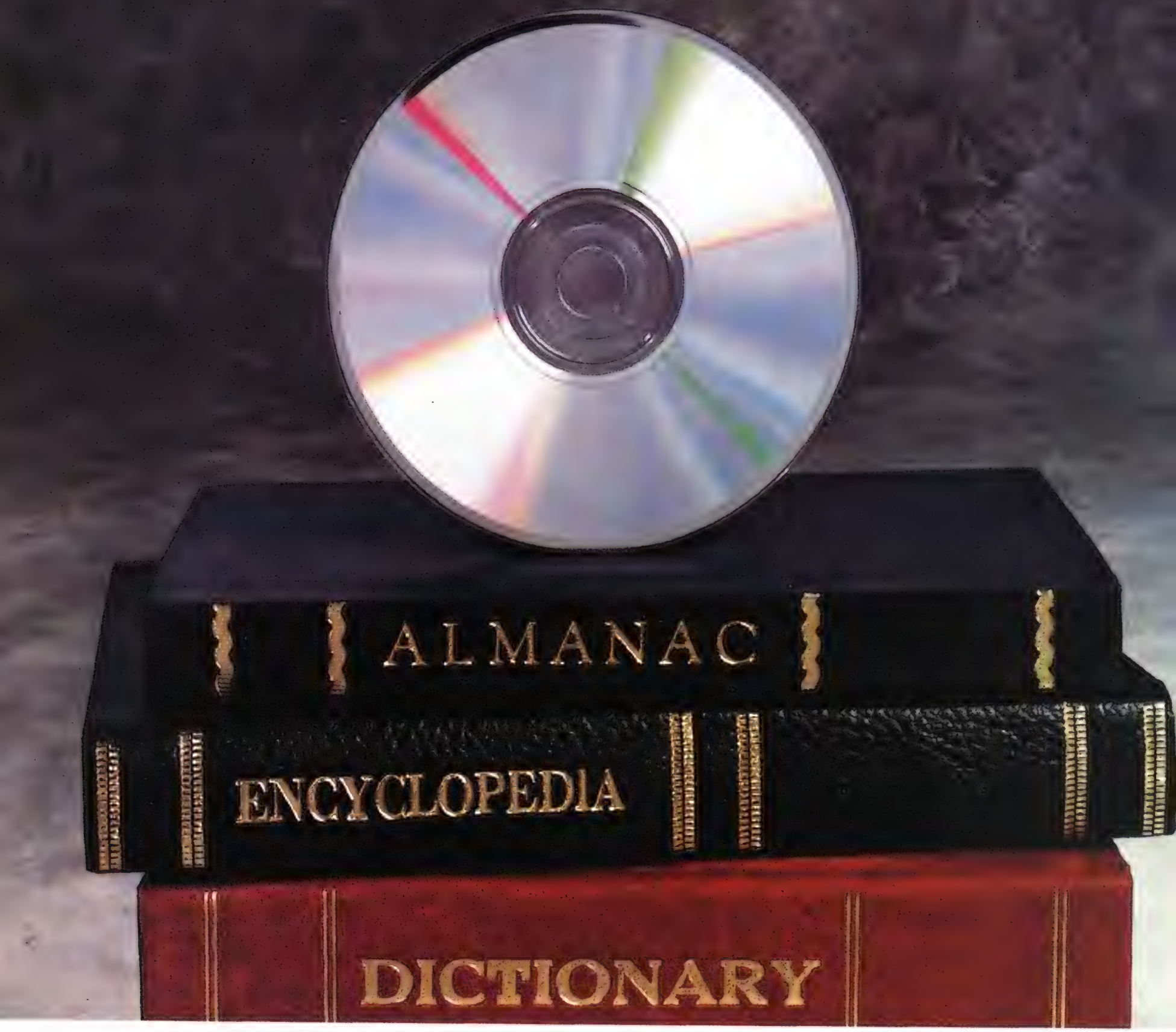

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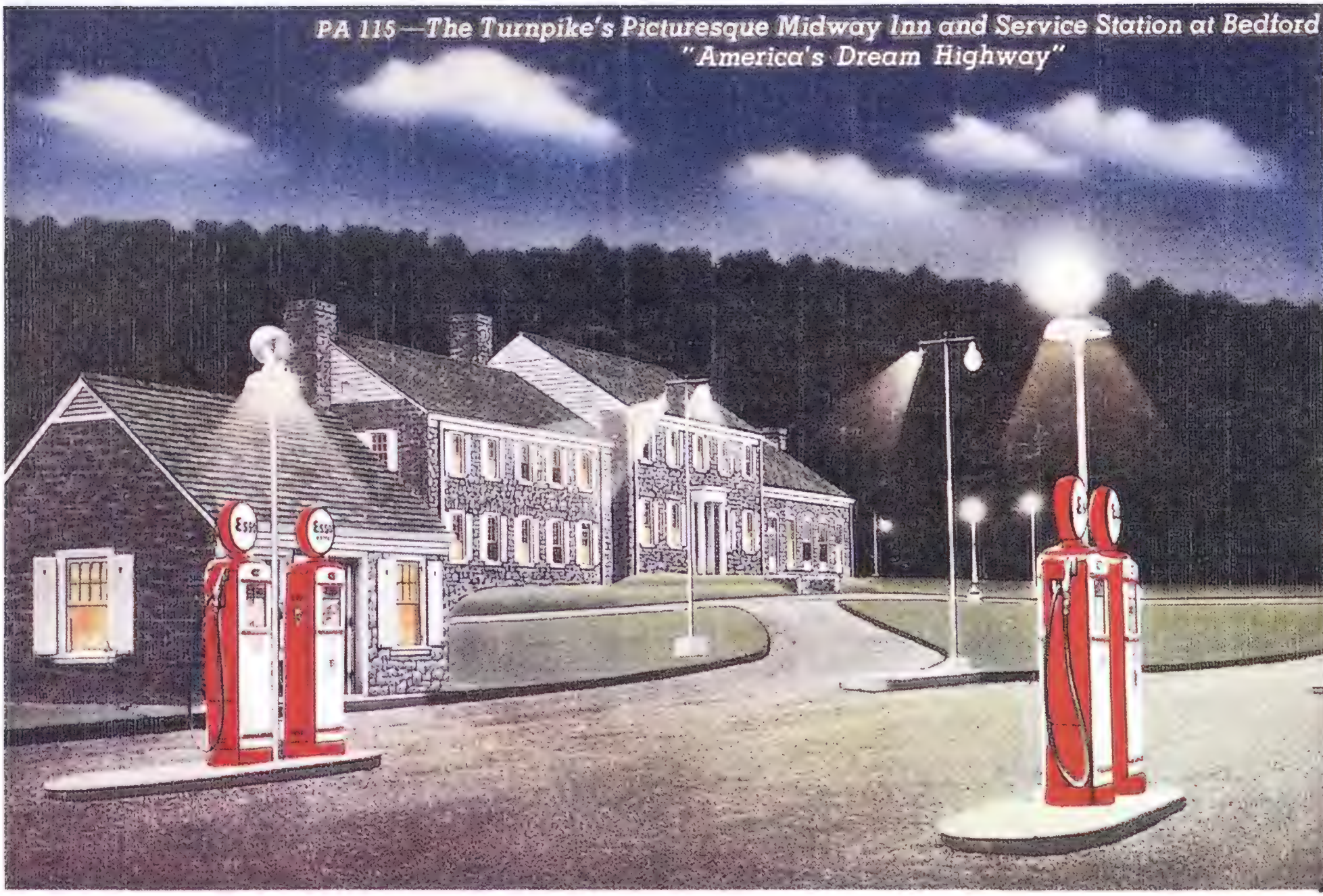


When the turnpike was new in the 1940s, a postcard of the inviting fieldstone restaurant at Midway showed it bathed in moonlight. It was actually a daytime shot, the moonbeams courtesy of a retoucher's artifice.

By Phil Patton

A quick way from here to there was also a frolic

Novelty and delight for a nation of motorists a half-century ago, the Pennsylvania Turnpike presaged the vast national Interstate System

It is the most powerful image among postcards that half a century ago helped romanticize the Pennsylvania Turnpike: a night view of "The Turnpike's Picturesque Midway Inn and Service Station at Bedford" on "America's Dream Highway." The big fieldstone building, home of Esso and Howard Johnson's, has been turned romantic by gauzy cones of light. In front, gas pumps stand like little red sentinels with haloed heads. In the sky, the clouds are tinged by the rays of an invisible moon that has drifted beyond the somnolent green ridgeline.

All the postcards of that day are suffused with the most romantic light: either moonlight bathing the bridges of the turnpike, making the concrete slabs fairly glow and the grass median turn luminous, or an ambiguous twilight painting the curves and deep cuts peach and pink. Even in views of the tunnel interiors, overhead lights become tiny moons, afloat in clouds of their own suffusive illumination.

The tinters and retouchers who created these linen postcards also helped turn a 160-mile expanse of concrete, punctuated with 307 bridges and 7 tunnels, into

Today, expanded and prosaic, the restaurant still serves food and souvenirs. But gone are the enticing commemorative plates, linen postcards, matches like Esso pumps—blue for Regular, red for Esso Extra.

the "Eighth Wonder of the World." Like the great dams of the West, like the Golden Gate or George Washington bridges, like such skyscrapers as the Chrysler or Empire State buildings, lionized in the 1930s, the Pennsylvania Turnpike stood in its early years as a monument to national pride.

The America of the '30s looked forward to the technological future, sleek as those gas pumps at the Midway Service Station, fantastic as the "Magic Motorways" visitors encountered at the 1939 World's Fair in New York. But it also looked back, searching for identity, toward an American tradition as solid as the Midway Inn. For such a nation, the turnpike became a psychological rallying point amid depression at home and a kind of bulwark against the rumblings of war and fascism overseas.

Today, as it marks 50 years of traffic since opening on October 1, 1940, it is easy to forget the imaginative pull of a mere highway, however advanced. The Pennsylvania Turnpike was America's first superhighway: four solid concrete lanes divided by a median strip, with gentle grades and wide, banked curves, constructed on the limited-access principle—without stoplights or crossings—its exits and entrances equipped with long turning and merging lanes. (It was a far cry from the 18th-century "turnpike road," a highway maintained by tolls on cattle and wheeled vehicles.)

The physical highway has been bettered by any number of its successors. But none of them have ever matched the dreamlike quality the turnpike possessed; none of them have inspired such postcards.

In the imaginations of those who collect its memorabilia, the dream highway, beyond the real highway, lives on. Peggy Stapleton used to collect tolls; today she collects turnpike cards and other ephemera (p. 102). Her feeling for the pike is, in a sense, a miniature version of the public's. She has a fond childhood memory of her family's Sunday drive to Midway for dinner. Now she collects for her children and grandchildren. The turnpike has persisted as a vital memory.

Neal Wood, Chief Bridge Engineer, works beneath a 1940 Pennsylvania license plate and a collection of commemorative plates, pennants, ashtrays and other turnpike souvenirs. There are several Polaroids of de-

Photographs by Keith Glasgow

caying bridge piers. Wood's job is to repair the overpasses that can be repaired and replace those that can't.

Driving the pike later, I saw what he faced. The overpass bridges, gently arched, Art Deco inspired, are brown and in places crumbling, suggestive of classical ruins. For the driver, like a repeated architectural element deployed across time as well as space, they give a rhythm to the road.

Although the turnpike's backers correctly boasted of its "all weather" drivability, early cards included no winter scenes. But when I drove it in April, late snow swam in little swirls across the concrete slab, frosted the trees by the edge of the guardrails and clung to the raised reflective letters of the signs.

To understand the turnpike's "all weather" importance you must not only drive it but also drive its predecessor, Route 30, part of the Lincoln Highway, which winds through the mountains between Philadelphia and Pittsburgh. That road rises sometimes as much as nine feet for every hundred horizontal feet, impassable for trucks in heavy snow.

Despite repavings and improvements, the turnpike today looks remarkably as it did half a century ago. To the sides, beyond occasional intrusions of mobile home developments, the hilly fields, the barns and their silos turn into Christmas card scenes in winter. Boulders jut out of banks in the great rough cuts that sometimes suggest the American West. The promise to ban billboards on the right-of-way and to block any on adjacent land with plantings of trees and shrubs was quickly forgotten. An early photograph shows a Mail Pouch tobacco ad on the side of a barn. I passed one such ad, surviving today.

The westward course of the turnpike roughly followed old Indian trails where Braddock and Washington ventured during the French and Indian Wars. The

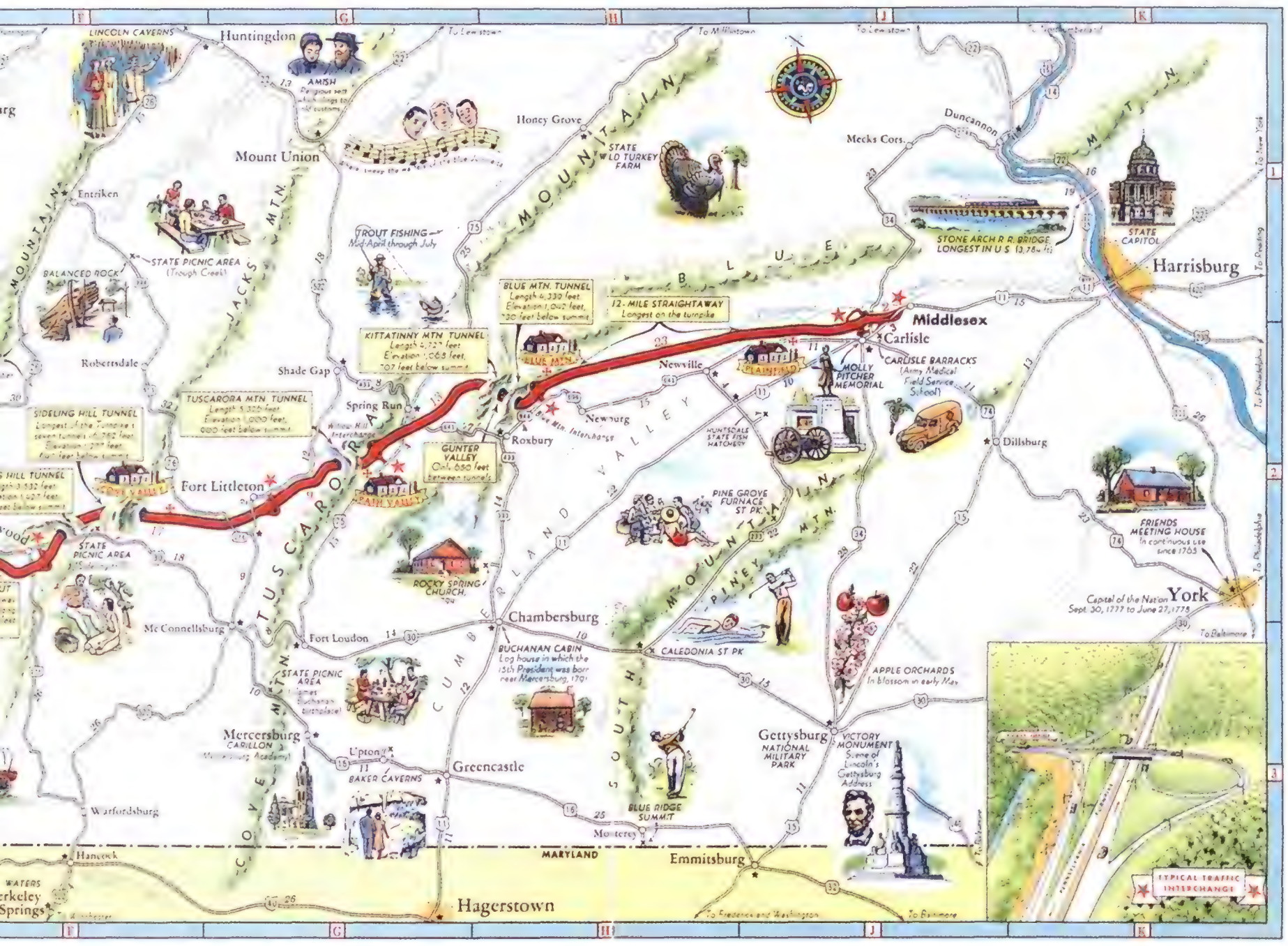
Handsome 1941 map told everything one needed, or perhaps wanted, to know about turnpike and environs. In addition to signaling food and fuel stops, it gave brief history lessons, pointed out interesting side trips.

Alleghenies were a historical barrier to the movement west, and all sorts of schemes were devised to conquer the ridges. The most ambitious came in the 1880s. William Vanderbilt's South Pennsylvania Railroad, one of the most elaborately planned civil engineering projects of the 19th century, was designed to pass through a series of massive tunnels.

It was Vanderbilt's bid, aided by Andrew Carnegie and Henry Oliver, to challenge the Pennsylvania Railroad. But, watching events from New York, J. P. Morgan saw a rate war coming, saw investor confidence sinking—and intervened to stop it. Workers laid down pick and shovel and walked away. The half-finished tunnels, which had cost $10 million and 26 lives, filled with water.

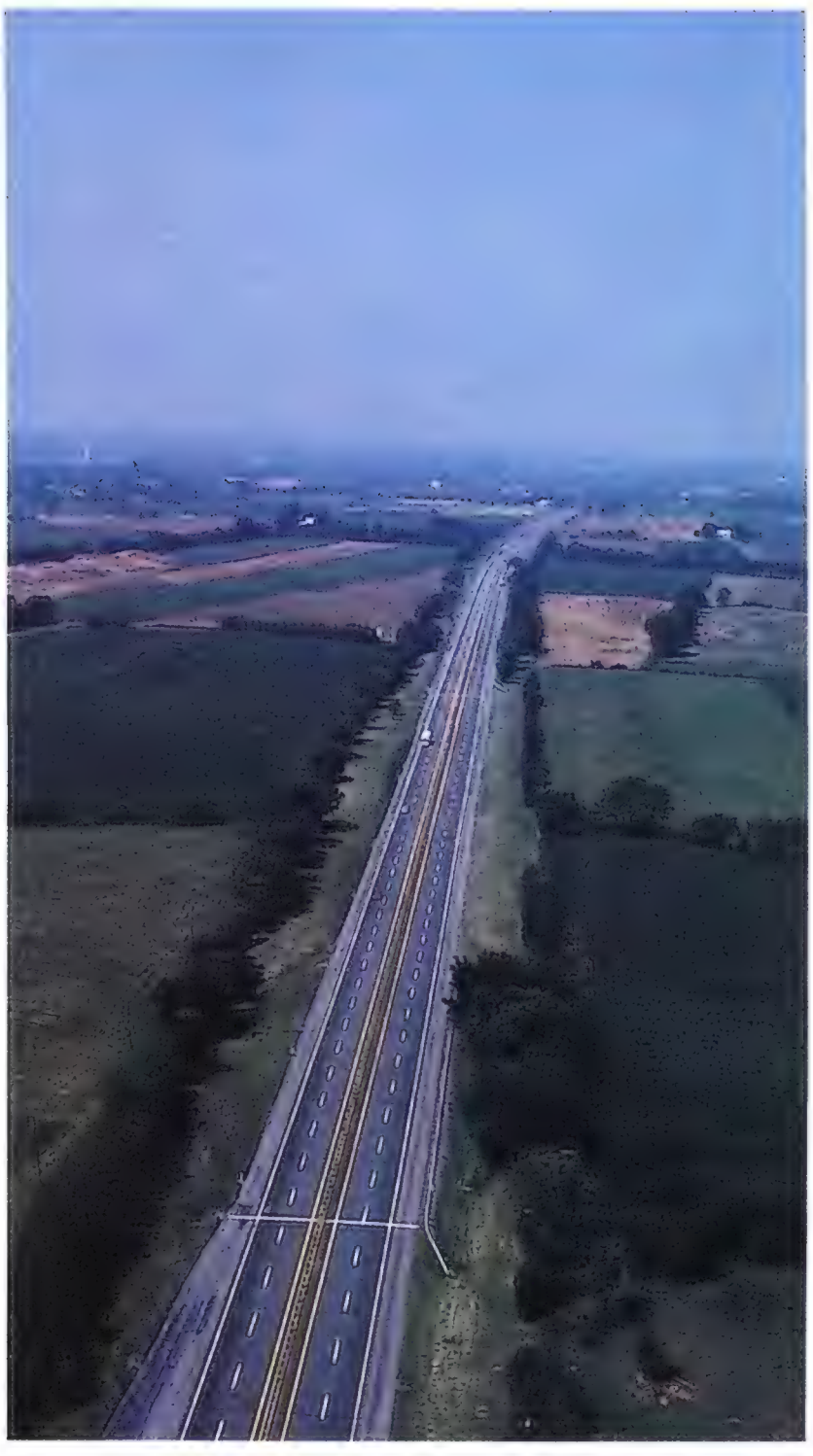
In time, however, as the story goes, they were to inspire the even more ambitious idea of an "all weather tunnel highway" in the fertile mind of one Ed Flickinger, a city planner who had played in these tunnels as a child, and of his friend Victor Lecoq, a member of the Pennsylvania Planning Board, the agency charged with long-range planning and job creation. Together, in the early 1930s they advanced the idea of completing the railroad tunnels and incorporating them into a superhighway running from Middlesex, west of Harrisburg, to Irwin, east of Pittsburgh. They enlisted the important support of truckers, led by William Sutherland of the Pennsylvania Motor Truck Association, and began promoting the idea to the State Legislature in 1935.

It was the era of the New Deal and great civil engineering projects putting men back to work. "Thousands of Jobs to Be Created By Tunnel Highway Project," blared *Highway Builder*, a state publication. It would be a safe road, too: "Tunnel Highway—Greater Safety." The publicists of the turnpike plan



Initially 160 miles long, from Middlesex to Irwin, by 1957 the road stretched to Ohio and the Delaware River.

The map had something for everyone: where and when to fish, ski, golf, worship—and view seven counties.



Often straight as an arrow, pike saved mileage but induced sleep; it taught a lesson to highway engineers.

skillfully manipulated the imagery. To put the tunnels to use again offered an appealing populist image of a beneficent, technocratic government fixing up wreckage left by the robber barons.

The tunnels, too, could be seen against the background of the time as an implicit promise of the light at the end of the tunnel of depression, a nation guided "through the night with the light from above." The illumination of Irving Berlin's lines seemed indistinguishable from the moonlight of the postcards.

There had been four-lane roads before. There had been limited-access roads, including the Bronx River Parkway, the Merritt Parkway in Connecticut and the Arroyo Seco Parkway, which was to become the first part of the Los Angeles freeway system and which also opened in 1940. But none had such scope. And there were other inspirations for the superhighway, from a different tradition and vision of roadbuilding: Hitler's autobahns and Mussolini's autostrada.

From the very beginning it was clear that practical economic arguments for the highway would be overshadowed by military and patriotic ones that spilled over into raw idealism—if not outright national chest beating. In the July 1940 *Highway Builder* magazine, Charles M. Upham of the American Road Builders' Association painted an astonishing vision: "This rich and productive nation will be like the 'promised land of honey and gold,' when the belligerents abroad tentatively settle their differences. . . . Our country will be enviously looked upon and coveted by the conquering lords of war. America has wealth, culture, power! . . . Our coastlines are the frontiers of a civilization. We are the custodians of Shangri-La."

Some thought it would never work

All this came as a prelude to a warning of the nation's military vulnerability—a situation that "arming roads" was to remedy. "Good Roads are Good Weapons," said *Highway Builder.*

The effect of superhighways on national pride, power and economics had been dramatically proved in Germany, where Hitler personally led workers, picks and shovels laid across their shoulders like rifles, to break ground. The autobahns too had been a project to create jobs (although later it would be charged that prisoners of war were put to work on them as well). But above all they facilitated military movement.

Not everyone in this country shared the urgency of arming roads by building a superhighway to the tune of $60 million. "You have to remember," says Dan Cupper, author of a new book on the turnpike, "how many people thought it would never work."

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An overpass dominated another '40s "moonlit" card. Median lured Sunday picnickers amid whizzing traffic.

Peggy Stapleton, showing off some of her treasures, started by collecting tolls, progressed to memorabilia.

pike's toll gates. Bankers and investors were the most skeptical. Without financial backing from the State of Pennsylvania, whose constitution required a referendum for any indebtedness of more than $1 million, they wanted nothing to do with the Turnpike Commission's bonds, which were to be retired and the tolls eventually removed.

But there was interest on the part of Franklin D. Roosevelt's New Deal, eager to find job-creating public works projects. The Reconstruction Finance Corporation backed the project and eventually bought $40.8 million worth of the commission's bonds. The Public Works Administration added an outright $26 million grant. Not by accident was it stipulated that the highway must be "substantially completed" by the end of June 1940, the month that the PWA was scheduled to expire.

The Pennsylvania Legislature had authorized the turnpike in 1937, but not until late in 1938 did work actually begin. The owners of the sturdy barns and houses along the route were independent folk, disinclined to sell a single acre of the "land of honey and gold." Sometimes their reluctance was expressed by the aiming of shotguns at commission surveyors.

During construction, the commission was careful that its efforts were not hidden from the world at large. An extensive photographic record, including the images with which the postcard makers began, was compiled by the turnpike's official photographers, notably one Jean Schwartz. Schwartz's car, parked on the shoulder, crops up in his pictures like Alfred Hitchcock's rounded profile in those signature film cameos.

I spent an afternoon looking at Schwartz's remarkable photographs, some of them prints, most only negatives, each in its brown manila envelope accompanied by a card telling where and when and at what he aimed his Speed Graphic—recording dust rising from the highway as graders rumbled along it, catching a great earth scraper ranging into pastureland like a belated triceratops. Among his images was one strikingly similar to the postcard of Midway at night. It had been taken in full sun, with attendants manning the pumps. The retoucher had removed the people, added the moonlight and turned day to night.

The commission found itself with just 20 months for actual construction. The work was accomplished with near-military urgency. Some 15,000 workers attacked the job simultaneously along the road's length, sometimes working as many as three shifts a day, at times by floodlights powered by gasoline generators. The wet spring of 1940 slowed work on the turnpike as the Nazi blitzkrieg rolled across France.

In April it was announced that Esso (Standard Oil of Pennsylvania) had offered the best bid for the gasoline concession at Midway and other service plazas along the turnpike. To run the restaurants Esso, in turn, went to Howard Johnson's, which had adopted the slogan "On All Important Highways." Howard

Phil Patton is author of Open Road: A Celebration of the American Highway. *His many articles for* SMITHSONIAN *have covered motels to Machine Age art.*

Raul Julia

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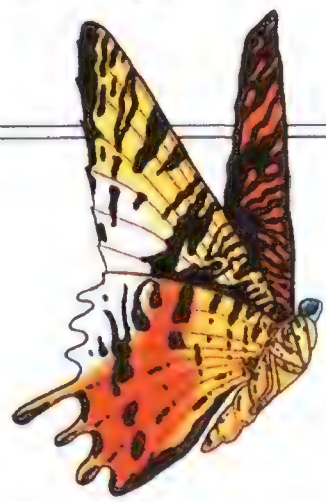

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During World War II, draftees were replaced at service centers by young women in smart uniforms.

At 12:01 A.M., October 1, 1940, merry group hammed it up celebrating opening of western terminus at Irwin.

To mandate caution in inclement weather, a revised speed limit of 35 mph was superimposed on the usual 65.

Called up in 1940, the National Guard practiced "war maneuvers" on highway before it was opened to traffic.

Cars had lined up for hours at either end, for the honor of being among the first to traverse the fine new road.

Standing on an overpass, spectators cheered troops that were on a 135-mile dash to "save" town of Bedford.

Johnson himself inspected the facilities and decided to gamble that the turnpike would become the most important highway of all.

Collecting tolls presented additional problems. Finally, a system was devised adapting IBM's already famous punchcards. Thousands applied for toll-taker jobs, among them PhDs and former bank vice presidents.

Through June, as France fell, work moved toward completion. The July deadline of "substantial" completion was met, but work continued. The restaurant at Midway was ready, juke box in the lobby, postcards already on their racks and poised for sale. The toll plazas were finished: dramatic functionalist architecture, their enameled blue, angled compartments sheltered by great overhanging canopies that the commission, with sure showbiz instincts, called "marquees."

The commission polishes the brass

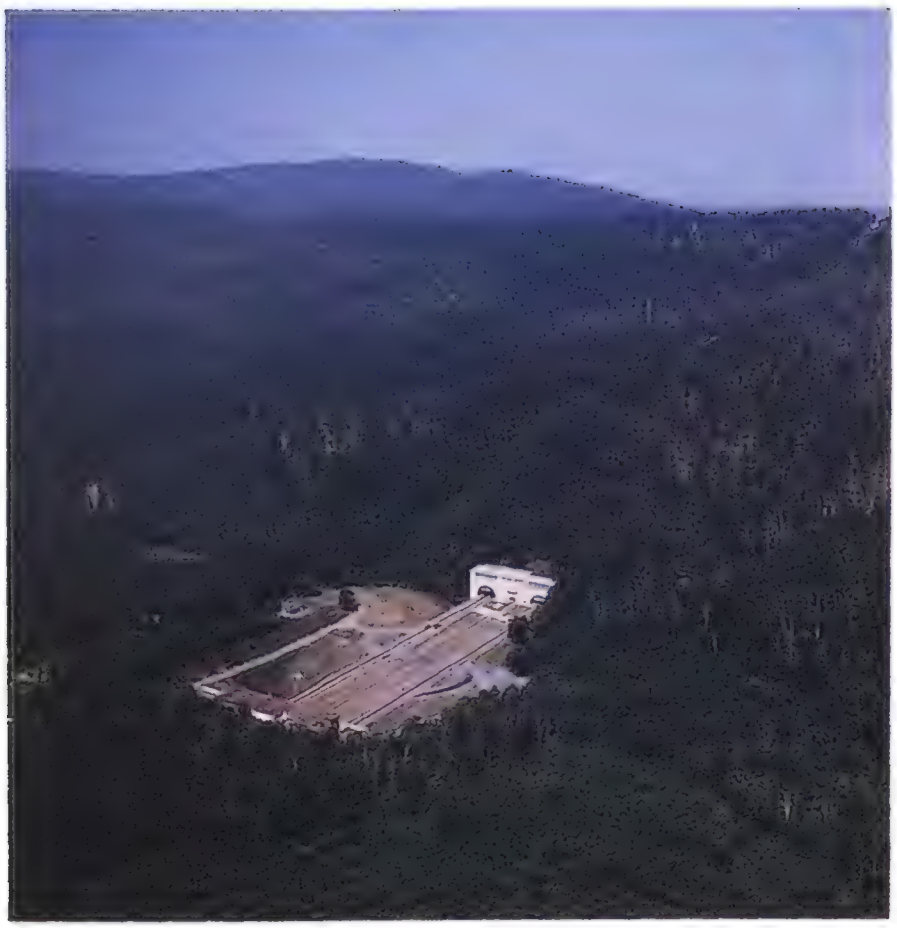
In early August, to prove the highway's military utility, the 108th Field Artillery of the Pennsylvania National Guard went on maneuvers, "defending" against a fictional attack on Bedford.

Later that month, the commission invited 175 VIPs—Senators, Congressmen, Cabinet members, lobbyists and contractors—on a tour of the new pike. They began from the Hotel Hershey near Harrisburg, then piled into a 93-car caravan and dashed along the pike at dizzying speeds to make a lunch date at Midway. By evening, they were dining in the posh Duquesne Club in Pittsburgh. The highway was ready to open.

For the ribbon cutting, FDR's attendance had been promised and, says Dan Cupper, all the little towns along the way waited in eager anticipation for the day that they knew would be the biggest in their history.

But a scheduled July 4 opening passed, as did one set for Labor Day. Between ground breaking and completion, the governor's chair went from the Democrats to the Republicans. The Republican members on the five-man Turnpike Commission were in a position to prevent the ribbon cutting from turning into a political rally for FDR.

With each day interest costs were building and tolls were being lost. Finally, giving the public less than 12 hours notice, the commission announced the pike would open at one minute past midnight, October 1. Dozens of cars lined up hours in advance. On their car radios people could have heard Edward R. Murrow reporting from London on the blitz. Some were returning from the World's Fair in New York, its second year overshadowed by the war, where they might have seen the future "Magic Motorways" sponsored by General Motors. GM would run an ad showing those multilane magic motorways and praising the turnpike: "The highway of tomorrow, here today."



Shortest distance between tunnels is a mere tenth of a mile, between Kittatinny and Blue Mountain.

Signs pointing directions, hawking gas, lodging and roadside museum cause visual cacophony at Breezewood.

When the clock struck 12, the first to take a ticket at Carlisle, the easternmost toll barrier, was Homer D. Romberger, a local feed and tallow dealer. Tolls were $1.50 for the full 160 miles, $2.25 for the round trip.

The road was an immediate sensation—so much so, that on Sunday October 6, traffic jams several miles long built up at the exits. In the first two weeks, an average of 10,000 cars a day paid their tolls. The turnpike shortened Greyhound's Pittsburgh to Harrisburg bus schedule from nine hours to five and a half. Within a year after its opening, commission officials were urging an expansion.

People were driving on the turnpike not to get somewhere but just to drive on it. Families—like Peggy Stapleton's—would take a Sunday drive to picnic by the roadside or even, the tales have it, on the grassy median. Or to dine at Midway, which took its name from its location on the pike and had become as festive as a carnival midway.

There, or at the small lunch counters, drivers would find Howard Johnson's famed 28 flavors of ice cream, "frankfurts" in their little squared-off buns and cardboard holders, fried clams "sweet as a nut." Upstairs at Midway was a dormitory packed with steel-pipe bunks for 38 truckers, a lounge complete with radio and pinball machine, and a separate lunch counter.

The modern highway inspired motorists to look more closely at the nature around them. "Cool woodsy stretches abound," proclaims one postcard caption. One of Peggy Stapleton's favorite cards is number PA 149, showing not a bit of the actual turnpike but a deep forest of dogwoods, their pinks and whites and greens turned up several notches in hue by tinters. Ordinary folks were inspired to near poetry. "We arrived safely . . . the Highway was beautiful with its canopy of stars and its many lights," reads the message on another card.

Driving would become an esthetic experience. With its divided lanes, removal of grade-level intersections and limitation of access, the turnpike promised to remove 90 percent of the causes of accidents. The road was designed so that the straightaways could be negotiated at 102 miles per hour and the curves at 90. But within days the high speeds showed something else: that, as *Fortune* magazine noted, the turnpike was "the first American highway that is better than the American car. . . . It is proof against every road hazard except a fool and his car."

Tires weren't built for the speeds being reached on the 12-mile straightaway near Carlisle. One blowout

Crumbling pier is evidence of havoc a half-century's exposure to the elements has wreaked on the masonry.

led to the first accident. Within three weeks came the first fatality. On October 19, Arthur B. Turner, age 66, of Bethlehem, died when his car skidded and flipped over between the Irwin and Donegal interchanges.

The governor had at first asserted that the statewide 50-mile-per-hour speed limit should apply to the turnpike too, but officials simply ignored him. For half a year there was no limit. But by April 1941 it was clear that there would have to be one: 70 miles per hour.

The turnpike taught another lesson about superhighways. "Highway hypnosis," the tendency of a driver to lose attention, fall asleep or "velocitate"—unintentionally speed up—was a hazard that grew from long straightaways. Future turnpikes would be devised to provide variety, gentle curves to hold attention, and changing perspectives.

After Pearl Harbor speed limits were dropped nationally to 35 mph except for military and other essential vehicles. Jean Schwartz's photographs show women replacing men as attendants at the Esso stations. With gas and tire rationing, passenger traffic declined, to be replaced by truck and military traffic. Sunday picnics on the median were forgotten.

After the war the bright sunshine of prosperity replaced the moonlit vision of the superhighway. Other states began building their own turnpikes, most of them wider and more comfortable to drive. By the late 1950s metal guardrails were going up on portions of the turnpike. The ten-foot strip of grass where early patrons had picnicked had proved dangerously narrow.

In 1956 came the Interstate System, of which the turnpike would become part—the oldest part, inasmuch as it had been conceived 20 years before the system existed. The turnpike grew, with extensions to the east opened in 1950, to the west in 1951. In 1956 it reached the Delaware River and a bridge connecting it with the New Jersey Turnpike. This last linkage marks a symbolic end: connection to that least romantic of turnpikes seemed to drain away forever the special magic of the original superhighway.

"Once it became hooked in to other roads," said Neal Wood, "it became just functional." The tinted linen postcards gave way to crisply detailed and unromantic glossy color photographs. Finally, turnpike souvenirs vanished completely from the shops at Midway and the other intersections. It was no longer a sight to see; it was just a highway.

But the turnpike had changed the land it traversed. It took traffic from the rival Pennsylvania Railroad and created an economic boom around King of Prussia

Both: Charles Isaacs

Once indebtedness was paid off, the turnpike was to have been toll-free, but now upkeep requires retaining collection. The first year's receipts were $2,719,830; 1989's nearly 100 times that.

and Valley Forge. Within two decades, empty fields were filled with offices, labs and light industry. Nowhere, however, were the economic effects more clearly illustrated than in Breezewood, a tiny town at the intersection with I-70 that has become the "City of Motels," flaunting a floating electric collage of logos, letters and hypnotically flashing neon arrows.

In 1989 the turnpike carried its two billionth vehicle. From the commission headquarters in Harrisburg, a fortresslike structure with a marble lobby, officials preside over new construction projects, 2,022 employees and 238 dump trucks. One of the most recent projects, the second Lehigh tunnel, involves shooting concrete into the newly cut bore to stabilize the roof and eliminate the need for a steel superstructure.

The original bonds have long since been paid off, but with new ones issued to pay for expansion, the promised abolition of tolls continues to recede. Ten percent of the highway is resurfaced annually, so that every decade essentially brings a new turnpike.

Slipping away too is the ideal of the federal highway trust fund that built the Interstates. Gasoline tax revenues were to have supported them and made tolls unnecessary. But as modern cars get better mileage, trust fund income, based on fuel consumption, has decreased. Rebuilding is long overdue on many portions of the system. More and more there is talk that to pay for it, we will see the imposition of tolls.

Today, Howard Johnson's is gone, the stone buildings it once occupied accented by awnings of the universal reds and oranges of a variety of fast-food chains. Inside are clean, well-lighted places, where truckers—bearded, sweatshirted, wearing the caps of teams whose games they listen to on the radios in their cabs—drive beeping video games.

Trucks own the road at night, straining up the grades, then heaving themselves down the other side. Car headlights make the trailers seem suddenly flimsy—shimmering curtains of foil, dotted with the cheap costume jewelry of their running lights. Even though other major east-west Interstates such as I-80 are both free and more advanced in design, truckers like the turnpike because it is better maintained and because the service facilities are right on the road.

Late one night I pulled into Midway and maneuvered my car as close as I could to the viewpoint of the magic postcard of Midway-by-moonlight and paused for a while. Snow danced in the cones of light and drifted over the pavement, romanticizing the scene. For a moment the whole place stepped out of time; the looming fieldstone structure hovered free of contemporary franchising. Or so I imagined, until my eye slipped back to the sign informing me that today the big stone restaurant at Midway houses an Italian restaurant and a frozen yogurt store.

I pulled down the ramp and back onto the road, reminding myself, before my foot grew too heavy, that I was back in the age of the double nickel—55 mph. The superhighway that once promised 102-mph straightaways has today some of the stiffest speeding fines in the country.

Misty evening enhances turnpike's pastoral quality; much of its 470-mile length traverses countryside.

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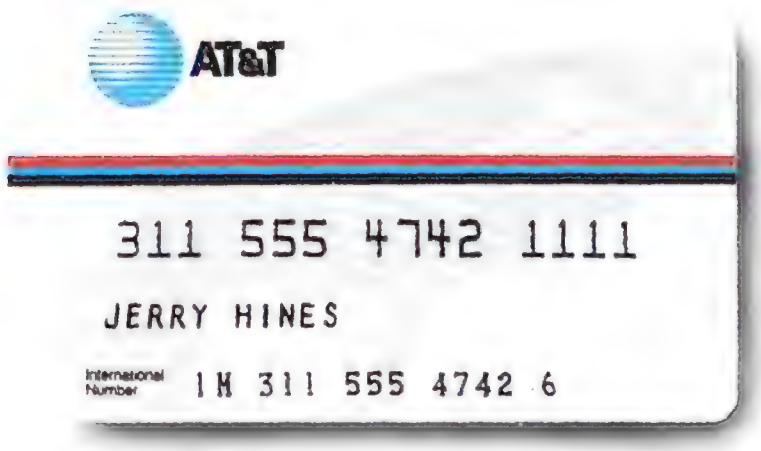

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By Richard Wolkomir

High-tech hokum is changing the way movies are made

The computer-aided con artists of LucasArts' Industrial Light & Magic beguile audiences with monsters, space armadas and spectral slime

LucasArts' fire trucks stood ready in the gulch. Camera crews bristled along the cliffs, like machine-gun nests. It was a minute until the train wreck. Even the executive from Steven Spielberg's Amblin Productions, who had been protesting a TV crew's presence at the shoot, was silent. It was Spielberg's film, but LucasArts Entertainment was handling the special effects. And all 55 people in the Northern California gulch were now staring at the clifftop, where an oddly small railroad trestle projected into the air.

"Here we go—stand by."

The voice of visual-effects supervisor Ken Ralston blared from the cliff, amplified by a loudspeaker to a resonance befitting the three-time Academy Award winner. He was about to detonate a lot of Steven Spielberg's money. In the gulch's mud, frogs croaked.

"Roll cameras!"

A Lilliputian locomotive hurtled soundlessly across—and off—the trestle. It swan-dived, then whammed into the gulch, exploding into smoke and bolts. After a moment, the frogs resumed croaking.

"Poor little train," a woman in the crew whispered.

The next day, LucasArts employees crowded into a theater at their San Rafael, California, workplace to see what the cameras had caught. Luckily, no vultures flapped onto the film, their size revealing the doomed train to be a quarter-scale runt. The modelers had copied a real Sierra Railroad locomotive, miniaturizing it to the maximum; any smaller and the flames and smoke would have photographed strangely. On the screen, a seemingly life-size antique locomotive, perfect in its Gilded Age detail, plunged to its doom.

After six months of preparation, one part of a single

Photographs by Michael Freeman

shot for *Back To The Future III* was done. It would last for just a moment on the screen, but it would be popping with drama—and with artistic flimflam. The perpetrators were some of the 300 craftspeople of LucasArts' visual-effects division, Industrial Light & Magic. ILM, as it is called, is moviedom's virtuoso of cinematic sleight of hand: scale-model starships, latex aliens, oil-painted Tibets.

ILM has won ten Academy Awards, two Emmys and six British Academy Awards. But, like the Wizard of Oz, ILM's magicians work unseen, pulling ropes and pushing pedals to project powerful images into our brains—black-masked Darth Vader breathes like a bronchitic bulldog as Luke Skywalker waves his humming lightsword; Indiana Jones careens through a mountain in a mine car; Michael J. Fox rides his doctored DeLorean (p. 115) back to the future; and the starship Enterprise, at warp speed, boldly goes where no one has gone before.

These days, even seemingly straightforward movies

This composite picture, with those on the next pages, conjures up electronic image-making techniques used by ILM to expand powers of special-effects artists: Jeff Mann controls a monster's head with computer.

Star Wars spacecraft, the Millennium Falcon, does a roll toward the camera. ILM technician uses computer to plot the pitch, roll and yaw of the four-foot-long model. Separate film images of each movement are then seamlessly combined to create the illusion of flight.

increasingly con us. For example, director Sydney Pollack needed a train for Meryl Streep and Robert Redford to ride in *Out of Africa*, but building one would have cost millions. Then George Lucas, scouting an African location for a film of his own, offered ILM's services. The veldt in the film's opening sequence was real, but the train steaming across it was an ILM miniature, choo-chooing for pennies in San Rafael—just as the firefighting planes that Richard Dreyfuss and Holly Hunter gallantly piloted in Spielberg's *Always* were ILM toys, braving the flames and updrafts of a California studio.

ILM does more business than its five major competitors combined, although it is tucked away 400 miles north of the film industry's Los Angeles center, on a humdrum commercial street in San Rafael. A few of the 12 ILM buildings have signs, but they say "Kerner Optical," a cover to keep starry-eyed youngsters from scrounging the trash for prototype lightswords and *Back To The Future* hoverboards. The signs also fend off spookier visitors, like the wild-eyed man with a briefcase who recently stopped two ILM technicians on their way to nearby Foodles sandwich shop.

"I've got the Star Jump map in here!" he insisted. "I've got to see George Lucas!"

"We work for this optical company," one ILMer shrugged. "Isn't LucasArts a couple of blocks over?"

They look bland, but these buildings engendered the shining aliens of *Cocoon* and the spectral slime of *Ghostbusters II*. ILMers—who have worked on six of the ten most successful films of all time—call one of their hallways the "billion-dollar corridor" because it displays posters of the more than 50 films for which ILM has created visual effects, from Lucas' own *Star Wars* and *Indiana Jones* trilogies to *Who Framed Roger Rabbit, E.T. The Extra-Terrestrial* and *The Hunt for Red October*. The posters span fewer than 15 years, but in that time ILM has changed the way movies are made.

It all started with George Méliès

It was at the turn of the century that a French magician turned filmmaker, George Méliès, invented "special effects"—the use of mechanical models, painted backgrounds and multiple film exposures to fool the eye (SMITHSONIAN, July 1981). He shot a spaceship from a cannon in *A Trip To The Moon* (1902), cut people in two and changed humans into beasts. By the 1920s, when big studios were in control of everything from actors to movie theaters, "tricks" had become a standard studio department. In 1939's *The Wizard of Oz*, for instance, Bert Lahr became the Cowardly Lion by donning a 90-pound costume; and special-effects artist A. Arnold (Buddy) Gillespie made a 30-foot tornado of muslin hung from a gantry that moved, filmed a mini-

A flying car? No problem when blue-screen process is used. It's a complicated way of superimposing one image onto another so that they appear to be part of the same picture. ILM modelmaker Steve Gawley (left) sets up diminutive DeLorean from *Back To The Future* series in front of a camera. He'll film it against the backlit blue screen . . . and many technical steps later a life-size car will appear to fly across a sunset sky.

ature house dropping from the studio ceiling, then reversed the film so that the house seemed to soar upward, lifted by the wind.

But in 1950 the Supreme Court broke up the studio monopolies, and independents soon began making low-budget films. With a newsreel-trained public demanding reality, on-site shoots were in vogue. Studio effects shops closed, the aging craftsmen retired and cinema tricks became virtually extinct.

TV commercials and an occasional film of the *2001: A Space Odyssey* kind kept some of the old skills alive. And then the car-racing ambitions of a young Californian named George Lucas vaporized in a crash. Deciding instead to parlay his zeal for photography into a career filming documentaries, he won a scholarship to the University of Southern California. Lucas eventually became director Francis Ford Coppola's assistant and then scored a hit with his own *American Graffiti*. In 1975 he began work on a fairy tale that would unfold a long time ago, in a galaxy far away. He called the bearded, blue-jeaned crew he assembled for the project "Industrial Light & Magic."

So powerful were the image-making techniques developed by ILM in *Star Wars* that today, when LucasArts archivist Don Bies shows you around the warehouse (p. 125) where ILM stores 1,200 costumes, models, creatures and painted backdrops from movies dating back to 1975, the actual relics look pathetic. "I was 16 when *Star Wars* came out and I did the whole fan bit, including seeing the movie tens of thousands of times and making my own R2D2 from a garbage can," Bies said recently, as he guided a visitor through the archives. "Here's Darth Vader's helmet." It sits on a shelf and is as shiny black and ominous as it was in the film, but it's merely lightweight plastic, like a child's Halloween mask. Slip it on and you find that the portentous Vader viewed the world dimly, through pinholes. ILMers remember an early take of Darth Vader in *Star Wars*: as regal Vader entered a captured spaceship, squinting through his pinholes, he tripped and sprawled on the floor.

Sometimes the ILM tricksters are shameless. When Ken Ralston, who would later preside over the wrecking of the *Back To The Future III* train, was choreographing armadas of model spaceships for an epic battle in *Return of the Jedi*, he got so frustrated that he added his tennis shoe to the rebel fleet. It whizzes by so fast that nobody notices it. "The definition of special effects is: Who cares if it's real, as long as it looks cool?" says Don Bies.

By superimposing the landfills he wrote about in last April's issue onto a matte painting of an abyss, the author might alleviate the nation's garbage glut.

That "look" begins with ILM's eight-person art department. "Until they get our artwork, everything is vague," says TyRuben Ellingson, whose artist parents named him (more or less) after the Flemish painter. He cites *Raiders of the Lost Ark*: "All the script said was, 'They open the ark and all hell breaks loose.'" Dreaming up various hells is the ILM artists' idea of heaven. "I've always thought there's nothing better than drawing monsters and spaceships," adds Mark Moore, who previously designed toys in San Francisco.

The artists here are young enough to wear rings in their ears. "I remember, as a kid in Minnesota, looking at a magazine picture of the motion-control camera that made *Star Wars* possible, thinking, 'That's so cool!' and now I work right down the hall from it," Ellingson boasts.

Some directors do bring "storyboards" to the art department—comic books that crudely depict scenes they are visualizing. "Oliver Stone doesn't use storyboards at all, while Steven Spielberg storyboards the entire movie," comments Doug Chiang, an ILM artist who studied filmmaking at UCLA after making his own visual-effects films in high school. Now Chiang and his colleagues turn directors' ideas into drawings that establish each film's look.

For *Back To The Future II*, set in 2015, the idea was to design everything with a 1950s feel but a futuristic twist. Chiang holds up a pre-production drawing by fellow artist John Bell for a future McDonald's eatery, staffed by robots. Another drawing shows tomorrow's taxicab, a flying 1959 Citroën. Ideas come from odd sources. Freeway lampposts have inspired the shapes of spaceships. For *Return of the Jedi*, when the evil alien Jabba the Hutt was struggling to be born, George Lucas sent the department a nature film of a huge, slimy queen termite on her nest, surrounded by smaller workers. That, he said, was how Jabba should look. Artists sculpted tiny prototypes, inches high, for Lucas to examine. The final Jabba was an amalgamation of several prototypes, a big latex puppet worked by cables.

"At a certain point, we have to get real"

"When you're oriented the way we are, it's not so hard to think up monsters," says Mark Moore. "But we'll design creatures with big necks and long skinny bodies, and then realize the actors couldn't get inside," adds TyRuben Ellingson. "At a certain point, we have to get real," says Moore, which sounds odd, considering what comes off the artists' sketchpads. Also, their studio's furnishings include a pencil the size of a baseball bat and an Uzi squirt gun. "No shooting above the knees," Moore cautions. And they like to vocalize what they draw, such as whooshing rockets. "We never let anybody in here when we're doing aliens," says Moore.

When a dog's life isn't necessarily what it seems to be: Shaughnessy (left) checks out Poochinski, a life-size bulldog run by electronics and air pumped through hoses; hairs punched into foam skin form his coat.

While designing submarines for *The Hunt for Red October*, the artists (making appropriate submarine sounds) peered at plastic hobby-shop submarines through a wide-angle lens to help them visualize a massive vessel moving underwater.

The art department's chief products—besides ideas—are storyboards detailing every shot that ILM will produce for a movie. For an effects-laden film, the storyboards can run to a thousand pages. They guide other specialists, such as the artists who create the background paintings called mattes. In *Indiana Jones and the Temple of Doom*, for example, the adventurous archaeologist-hero emerges from a tunnel onto a cliff. The entire vista was a matte painting, with one patch left unpainted: the cave mouth. Here technicians could project film of Harrison Ford and the other actors, while a camera shot both the matte and the projected image. In the finished film, as so many of us recall, the actor seemed to stand on a ledge, high on a cliff.

"It's not an illustration; the technique is subtlety of light," says Ed Jones, director of ILM's post-production, who won an Academy Award for blending cartoons and live actors in *Who Framed Roger Rabbit*. He points to a matte painting on his office wall. It shows Darth Vader's space shuttle, just landed, with a blank

Bruce Walters operates animation camera that puts anything from objects to fiery vapors onto film, frame by frame. It has been used to create such effects as (clockwise from the top center) a spherical force field in *Explorers* (Walters himself is in it here), *Star Wars* space explosion, two characters from *Willow*, two red flying figures from *Body Wars*, (at Walters' back) Jack Nicholson's tennis ball from *The Witches of Eastwick*.

space for projecting film of the actor walking down a ramp. Jones says such paintings often look blurry up close, but that is purposeful. "It has to have atmosphere, so that the acuity recedes," he says, citing the haze that makes real, distant mountains look fuzzier than nearby peaks.

Storyboards are also sent to ILM's creature and model shops, which can look surreal. On a recent afternoon, two craftswomen were meticulously sewing synthetic hair, mixed with yak and camel hair, onto a latex-foam bear that would turn into a bull for a Merrill Lynch TV commercial. Nearby, three *Hunt for Red October* submarines lay beached on the floor. Two men carrying an airliner for *Diehard II* walked past a knee-high Manhattan subway for the recently released *Ghost*. To create reflections in the tiny subway when the cameras were rolling, modelers wet the tracks with alcohol—water would have formed beads large enough to give away the train's size.

Model-shop project supervisor Lorne Peterson, a gray-bearded veteran of *Star Wars*, says a model's size depends on such considerations as the shot's required depth of field and the mass needed, say, to make an airplane crash look real. Some models must be large enough to contain electric motors, batteries and lights, and they require fans or even air-conditioning to prevent their overheating. "When we filmed *Return of the Jedi*," he tells me, "a cameraman uncoupled an air hose that was cooling an imperial spaceship, because he didn't like the hissing—and the lighting apparatus in the $150,000 model melted."

Not all of the creations are so complicated. "In *Ghostbusters II*, the river of pink slime running under New York City was methacyl, which is a food additive used in things like milkshakes," Peterson continues. "Hands reached up through rubber at the bottom to create pseudopods that could grab people." For *The Empire Strikes Back*, the modelers created a tabletop snow planet made of baking soda and microballoons (tiny glass spheres used in making plastic products). Much of the filming was stop-motion animation, in which the camera shoots one frame and then technicians move part of a model or figure (such as an arm) a fraction of an inch. The camera shoots again. Then the arm is moved a little farther. When the film runs at normal speed, the model seemingly comes to life. "But, moving the models, we couldn't disturb the 'snow' or it would swirl on the film as if it were alive," explains Peterson. The solution was trapdoors: between exposures, the doors popped open and skilled hands

reached out to move the models for the next exposure.

Some of those models were "imperial walkers," mastodonlike battle tanks with long legs. To perfect the designs, the modelers studied a rented elephant. Often, imaginary equipment has such real roots. George Lucas once suggested basing a space cruiser's design on an Evinrude outboard motor. And modelers who were asked to create a leather neckpiece merely sent someone to a nearby shop to buy an everyday wide leather dog collar.

In a climactic scene in *Indiana Jones and the Temple of Doom*, Jones had to fight a villain on a rope ladder while alligators swam far below. Because of the technicalities involved in the superimposing of film, the shot required black alligators on a white background. Lorne Peterson remembered that a local Volkswagen mechanic kept small pet alligators, which he borrowed, promising to turn them into movie stars. "We put the little alligators in a big tank and filled it up with powdered milk, which wouldn't hurt them," says Peterson. "Then we put a camera on the ceiling, while we got people to stand on the sides of the tank and wave dead chickens to get the alligators moving—we called them 'chicken wranglers.'" As Jeff Mann, the ponytailed manager of ILM's creature and model shops, says, "The key is knowing how much you can get away with."

Today's special-effects artists get away with less than the old-timers did, because audiences are more sophisticated. Stop-motion figures like King Kong, for instance, used to move jerkily, but stop-motion figures have no blur. So, because anything filmed in motion is normally slightly blurred, ILM developed "go-motion," in which a computer moves both camera and model to create a realistic blur.

Concurrently, the modelmaker's craft has also advanced since King Kong's first incarnation. Creature maker Tad Krzanowski, who graduated as a geophysicist in his native Poland and has since won an Academy Award for his ILM work, recently demonstrated a bulldog he is developing for a TV series: it is filled with wires, tiny motors and transistors (pp. 116-17). "We're getting smaller and smaller," he says. "The whole trick is to have it move like an animal, not like a robot." For

Oscar-winning seawater pseudopod in *The Abyss* was constructed in a computer, its texture and surface ripples added with custom-made software. As the pseudopod encounters the two principal actors in the film, it takes on the contours of their faces (upper right). To achieve this effect, the faces of Mary Elizabeth Mastrantonio and Ed Harris were scanned by laser and the results (lower right) fed into the computer.

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Seated at computer console, Peter Daulton controls ILM's "go-motion" Vista Cruiser camera, which hangs from left end of girdered boom. To make movement of models (like trains) look more authentic, go-motion creates realistic blurring of film image by moving both the model being photographed and the camera—as shown by model engine from *Back To The Future III* and "action" close-up of the camera itself (top right).

some models, he says, the operator sits in a wired chair and when he moves an arm, leg or his head, the robot exactly duplicates the motion. "I don't know that there's anything you couldn't do now," says Jeff Mann.

In one ILM studio, a train is flying. While a technician works at a computer console, the model locomotive—supported by a motorized armature—does a slow hula in front of a blue screen. It is another shot for *Back To The Future III*, but this train will soar like a hawk instead of crashing into a ravine. It's the most complicated model that ILM has ever made. Modeler Steve Gawley gave it 21 "gags," or active parts. To simulate time travel, in one gag, liquid nitrogen concealed in the tender can be pumped through tubing to freeze the train's skin, giving it what Gawley calls "that time-travel look." Its wheels fold out and chug horizontally. "Turbo-thrusters," to propel the train in flight, light up in the rear. Side panels open for wings to unfold. Amtrak can't compete. But even a master modeler like Gawley couldn't make the train fly. ILM's motion-control technicians, however, can get it aloft.

"It's actually the camera that moves—the train will seem to fly away, turn and then fly back," says Peter Daulton (above), who operates the computer that controls the camera and the model. Peering at a test video of each completed move, he continually adjusts the train's flight path until it is perfect. Directed by his computer, the armature makes the train bank into imaginary turns, tip up for imaginary ascents, nose down for imaginary descents. Simultaneously, the computer moves the camera backward and forward, up and down, while Daulton makes tiny adjustments. Ultimately, filmgoers will believe that a locomotive can extend wings and fly. But first, technical experts must blank out of the final image the train's supporting armature. Also, the train flies against a blue screen only; there is no landscape below, no cloud-filled sky above. As Ed Jones puts it, "For us to create an image, we have to create a *marriage* of images."

John Ellis, one of ILM's veteran "optical dogs," is an ace wedder of films, an extremely complex craft. By superimposing negative and positive strips of film, sometimes with certain parts blanked out, sometimes with parts of the film developed and other parts still

"The field cannot well be seen from within the field."

Ralph Waldo Emerson

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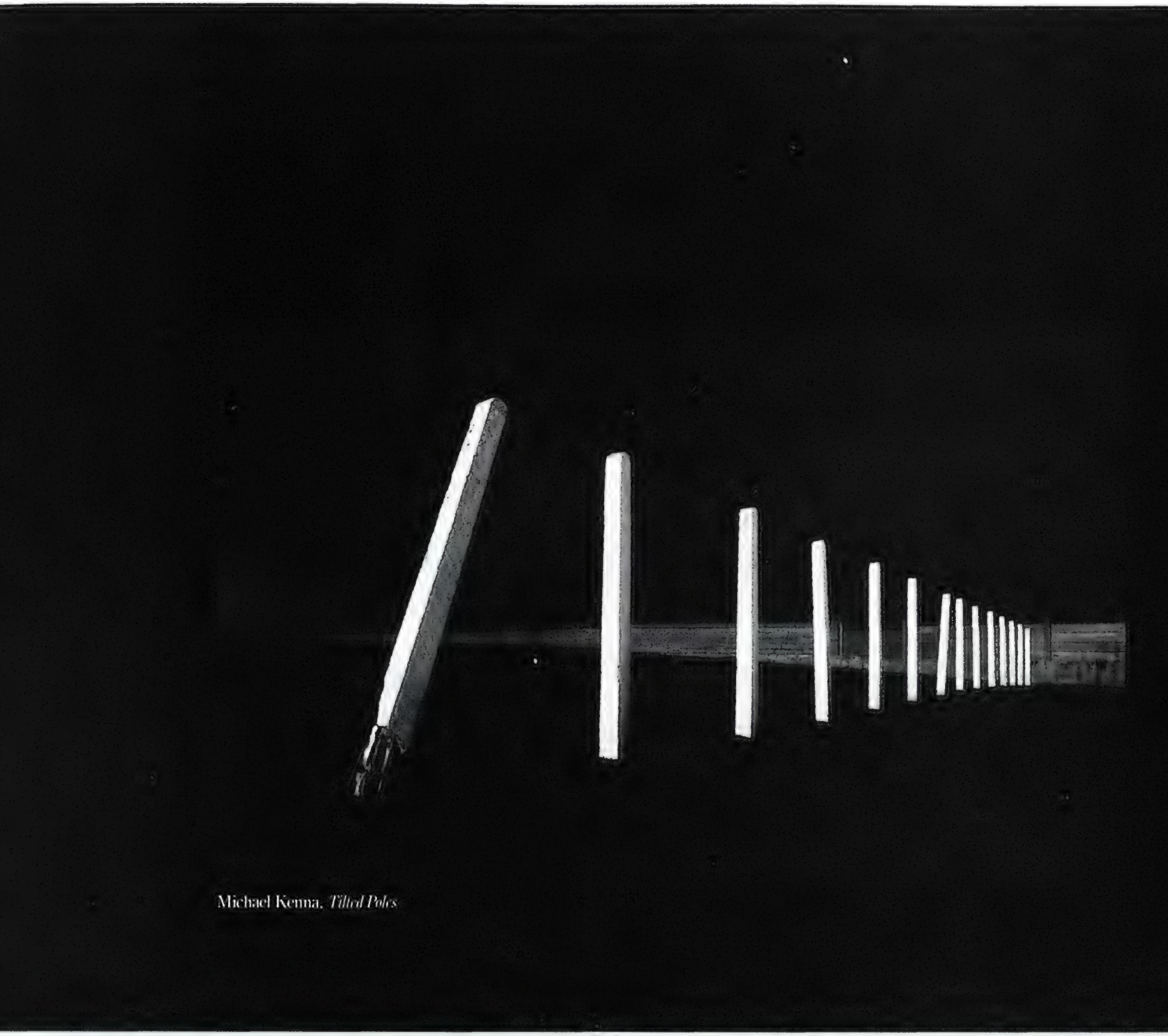

Michael Kenna. *Tilted Poles*

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In Touch with Tomorrow

TOSHIBA

undeveloped, and then projecting light through the sandwich of films to combine their images onto a new film. Ellis and his associates can remove unwanted images (such as the armature holding up the flying train). They also can combine images that were never together in reality.

In his office, Ellis shows me a strip of film in which Mary Steenburgen dangles upside down against a bright blue background. It is part of a shot for *Back To The Future III*, in which her character, in need of immediate rescue, hangs from an onrushing train. "Mary was a good sport about this," he notes. "We can't actually hang a lady from a train, so we hang her in front of a blue screen, with a fan blowing her hair, and we shoot the train separately," says Ellis, a balding man who stamps interoffice mail "RUSH RUSH OHMYGOD PLEASE HURRY."

Ellis holds up another section of film, this one showing a train's churning wheels. Step by step, he demonstrates how this image and the film of Steenburgen are manipulated and combined to ultimately produce the upside-down-heroine scene. Although the actress appears to be exposed to extreme danger, in reality, Steenburgen is dangling in the comparative safety of a movie studio. "That's the simplest shot we do in that movie, and it takes 11 different strips of film to do it," Ellis says.

Such crafts function like medieval guilds, with masters teaching apprentices. John Ellis learned the basics from his father, who owned a special-effects optical company. In *Star Wars*, John helped complicate the craft of visual effects with the introduction of computer-directed "motion control" cameras, so that shots could be precisely repeated many times, with new features added to the image at every pass. But the medium was still that of George Méliès: film. Now an evolving new technology will change forever the way in which movies are made.

Although *The Abyss*, the recent undersea adventure, lit no critical fires, it won an Oscar for best visual effects. The crew of a seabed drilling station encounters aliens on the ocean floor. These extraterrestrials create a seawater tentacle for exploring the station. Filmgoers watch this pseudopod as it snakes through the base and communicates with the crew by mirroring their faces in its sensitive tip (p. 118). One crew member inserts her finger into the pseudopod and discovers that it's merely seawater. The frightened humans finally shut a door on it, severing its tip, which splashes to the floor. Then the rest of the pseudopod withdraws back into the sea.

The award-winning pseudopod shimmers and ripples like real water, but it was created in a computer. After the digital creation was completed, it was transferred to film. "Jim Cameron, who directed *The Abyss*, came to us with a specific idea that he felt couldn't be done using standard visual-effects tools," says Nancy

With 600-gallon cloud tank (ILM invention) Bob Finley is able to create all sorts of effects in the "sky," which consists of a layer of fresh water on top of a layer of salt water. To make clouds, he loads a syringe with white paint, then injects the paint just above the invisible division between layers of water. Because salt water is heavier than fresh water, the paint stays in the fresh (upper) layer, giving a good imitation of clouds. Here, cloudmaker seems encircled by his own stratocumuli.

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Like a macabre tombstone, the block of carbonite in which Darth Vader froze Han Solo (played by Harrison Ford in the *Star Wars* trilogy) stands in ILM archives.

St. John, executive producer of computer graphics.

Before *The Abyss*, the ILM computer experts had brought a dead planet to life in *Star Trek III: The Search For Spock*. In *Young Sherlock Holmes*, they'd caused a church window's stained-glass knight to attack a startled cleric. They'd filled the Shanghai sky with formations of Japanese warplanes in *Empire of the Sun*, turned a raven into a tortoise and a succession of other beasts in *Willow*, and aged an evil Nazi 400 years in *Indiana Jones and the Last Crusade*. But the pseudopod was their masterpiece.

To show me how it was done, Steve Williams, a young Disney-trained animator from Toronto, wearing the motorcycle boots and Harley cap of the "Nanook Angels" (a cartoon Eskimo snowmobile gang he created), summons up on his screen a wormlike wire outline: the prototype pseudopod. "It's like using digital putty," he says, moving a computer mouse to twist the on-screen image. The operator, he explains, can choose among 17.6 million color tints. On a computer program, the animators had created an analog of the movie set, with its lights. As the image of the pseudopod developed, the computer set up the correct highlights and shadows. Meanwhile, with a scanning machine, the animators digitized scenes already filmed and fed them into the computer to blend with the computer-generated pseudopod. Jay Riddle, ILM's computer-graphics-animation supervisor, says that technicians even digitized the actors' faces, enabling the pseudopod to mirror them. "The actor sits in a chair and a laser circles his head, precisely measuring all his features," says Riddle. The data then feed into the computer.

Such a technology might be used to produce a film co-starring Tom Cruise and silent-screen actress Clara Bow. Movies might be generated entirely within computers. Steve Williams predicts that "the illusion will be so powerful you won't be able to tell what's real and what's not." *The Hunt for Red October*'s model submarines, for example, were shot in a dry studio with mineral-oil vapor producing an underwater effect. Computer graphics added particulates to the film to make the "water" look more real.

"We're adding more magic to the toolbox," says Nancy St. John. According to ILM chief Scott Ross, a 38-year-old displaced New Yorker and spare-time saxophonist, visual effects' growing sophistication gives filmmakers new freedom. Seven of the top ten hits of the 1980s were effects movies, notes Ross. "We're seeing scripts now where the writer creates whatever he or she wants, without worrying about how to produce it technically," he says, citing *Empire of the Sun*. "Aligning hundreds of real planes with thousands of extras in the streets would have been a huge problem, but we did it with a computer, multiplying one plane into squadrons."

Directors sometimes fear that visual effects will take control. "And a lot of them fear the technical terms, like 'g-matting,' 'rotoscoping' and 'black centers,'" says Ross. And there are times when the effects artists feel unappreciated. That may be why, in LucasArts' *Willow*, the evil two-headed monster, Ebersisk, sounds so evocative of film critics Roger Ebert and Gene Siskel.

For ILM's effects wizards, reality is merely raw material. One movie poster along their billion-dollar corridor is for *Honey, I Shrunk the Kids*, which was directed by ILM alumnus Joe Johnston; it's the all-time top-grossing film for a first-time director. ILMers are proud of their colleague, but they worry about Hollywood egotism. They have reduced his poster to the size of a postcard, a visual effect. In tiny type, theirs says: "Honey, I Shrunk the Poster!"

Star Wars robot C-3PO dwells in archives with fellow "filmflams" including matte paintings, Indiana Jones' hat and whip, Darth Vader's mask and the Holy Grail.

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With eerie time exposures, high-tech lighting and an instinct for drama, Roger Ressmeyer documents the coming of the second space age

At the age of 12, Roger Ressmeyer built himself a telescope out of a 5-foot-long cardboard tube and a 6-inch mirror that he'd polished and ground in his basement for 120 hours. "I was a complete space nut," the photographer says today. Son of a Long Island minister, he spent his evenings out in the churchyard, scanning the heavens. "But having built a telescope," says Ressmeyer, "you want to prove how good it is; and the best way to do that is to take photographs through it." So he modified his camera to shoot through the scope.

In his new book, *Space Places*, published this month by Collins, Ressmeyer again uses photographs to prove how good something is. This time, it's humankind's effort to understand and explore space. Early in 1989, Ressmeyer realized that on magazine assignments during the previous ten years he had documented about half of the significant observatories and space programs worldwide.

Amazed by the variety of nations involved—from French Guiana to China, from Chile to Japan—and by the cooperation among them, he went to the Eastman Kodak Company with a proposition. "I told them I could take another five years to complete the story in the course of doing magazine assignments—or I could do it in a year, if they supported me." They gave him the go-ahead, and he met the deadline.

Despite recent setbacks in the U.S. space program, Ressmeyer is convinced that the world is on the brink of a second space age, and that a global community of scientists is now forming to meet the challenge. "I feel that we are, in 1990, in the same position we were in around 1960, when nobody, not even the scientists who knew how to do it, could believe that we were going to be on the moon in 10 years. We'll get a lot farther than most people think in the next 12 or 15 years. Maybe Mars . . . I think 2005 is a good target date."

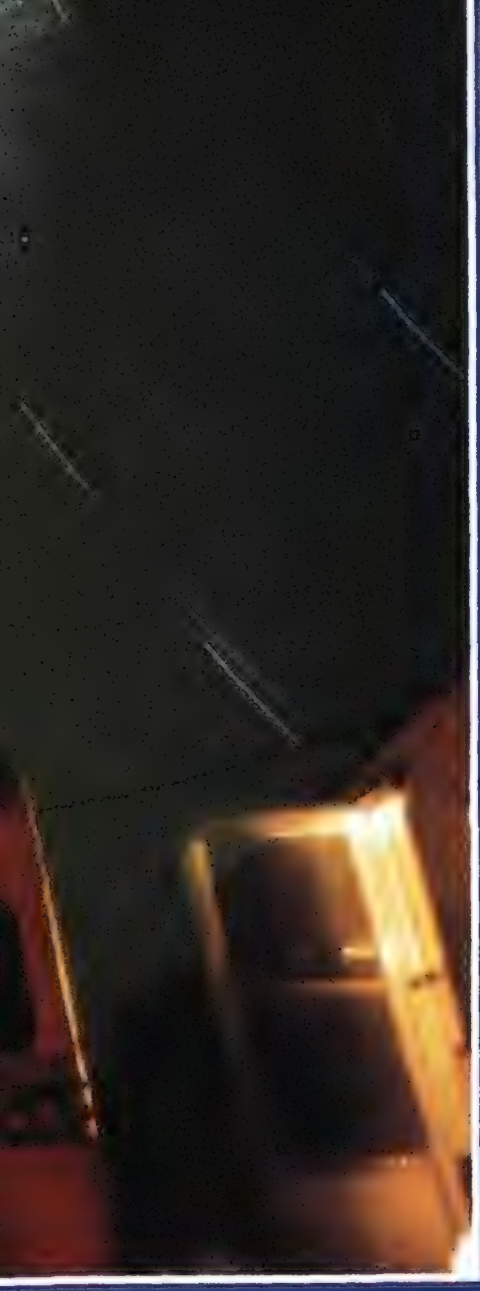
Constance A. Bond

Technicians inspect Long March 3 rocket at Xichang in China's Sichuan Province. The launch vehicle can place a 3,000-pound payload in orbit, making it competitive with European Space Agency boosters.

Ressmeyer found access at Xichang to be tightly controlled. When he entered the Launch Vehicle Test Building, he was told not to go near the end of the vehicle where the engines are located.

Photographs by Roger Ressmeyer/Starlight

The twin domes atop the Alcatel Espace plant in Toulouse, France, are inflated clean rooms where satellite antennas are tested before flight. Their walls are made of thin plastic so that they will not interfere with transmissions between the antennas and the distant towers that receive their signals. This facility supports the European Space Agency's Ariane rockets, which perform more than half of the world's commercial launches.



Rapid-fire pulses of laser light are fired at the moon from the McDonald Observatory near Fort Davis, Texas. There they strike panels of small reflectors left behind by the Apollo astronauts and bounce back to Earth. Precise timing of the round trip gives the distance to the moon within inches. Normally, light from a laser is invisible; during this ten-minute time exposure, Ressmeyer walked under the beam, blowing smoke up into it.

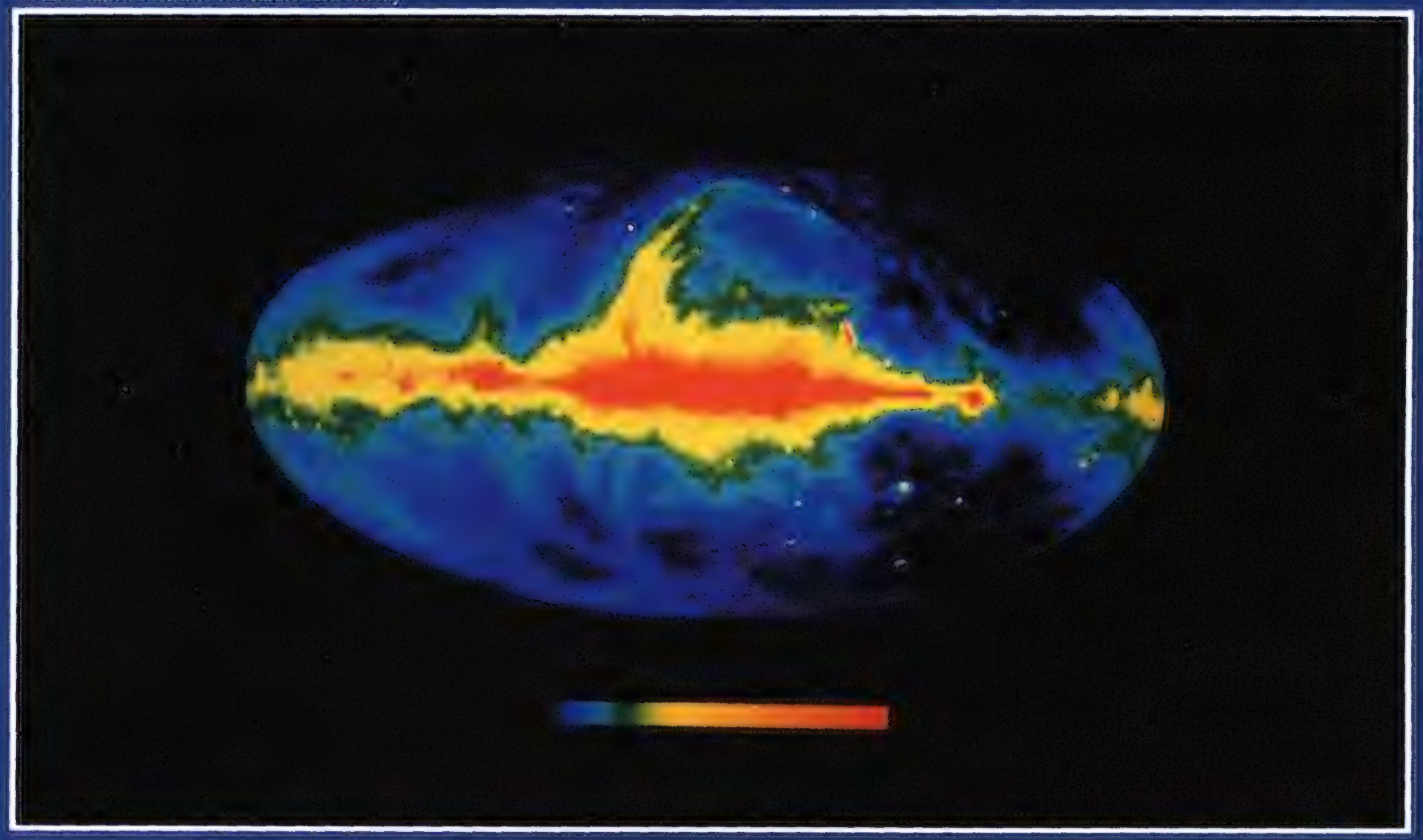
A red flashlight traces an astronomer's late-night path below a radio telescope at the European Southern Observatory in Chile.

Roger Ressmeyer with Ian Shelton

After discovering Supernova 1987A with a smaller scope, University of Toronto astronomer Ian Shelton took nightly measurements through this 61-cm telescope at Las Campanas Observatory in Las Serena, Chile. The exploding star is the upper of two bright spots in fuzzy area over scope.

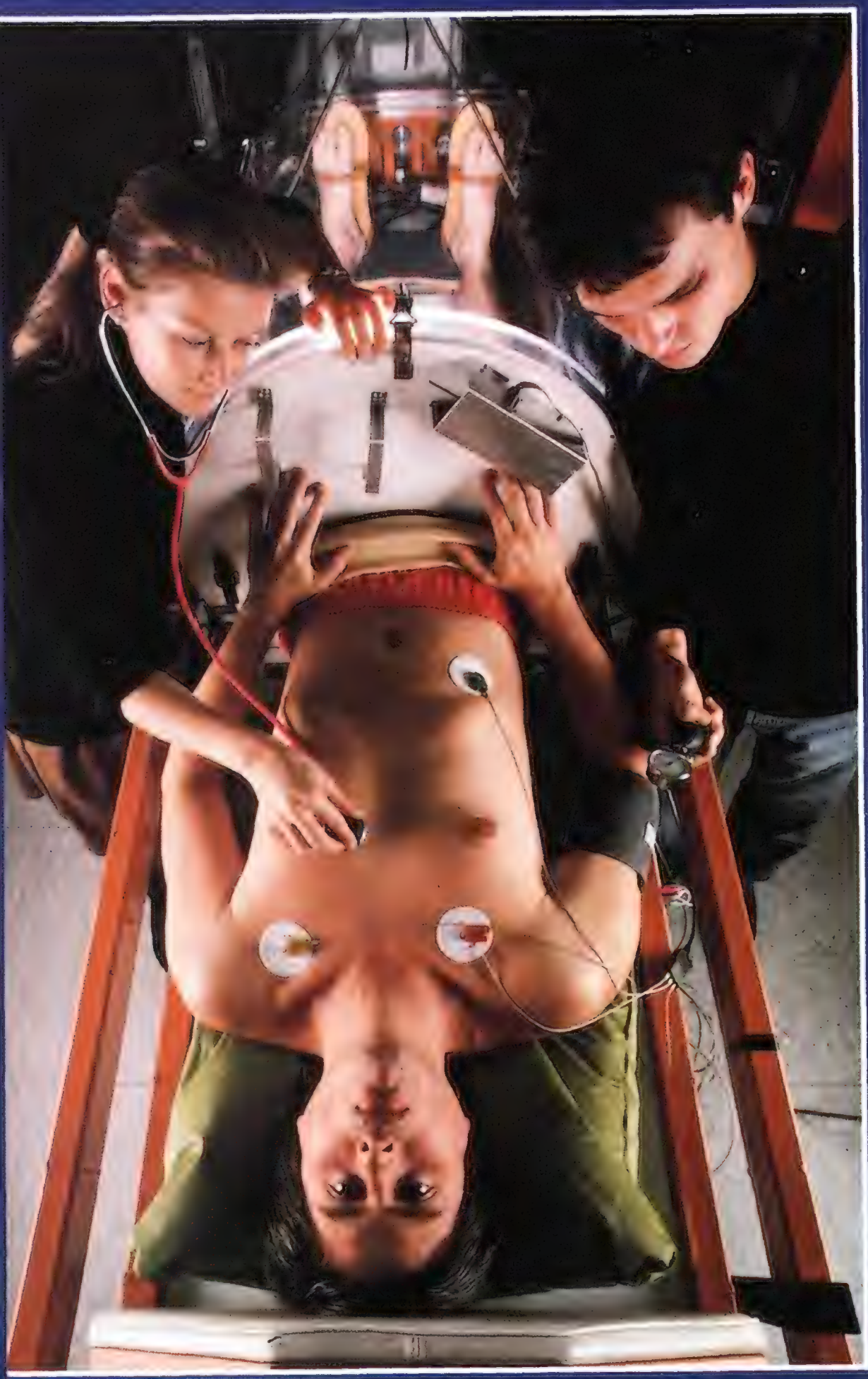
Telescope at Crimean Astrophysical Observatory in the USSR, called a coronagraph, simulates solar eclipses. A metal disk obscures the sun, which enables scientists to study the inner section of the corona.

© Max Planck Institute for Radio Astronomy



Our galaxy, in red and yellow, dominates colorized portrait of the Universe as seen at radio wavelengths.

The Ressmeyer book includes several such images, not made by him, to show new ways of seeing the cosmos.



The look of suppressed anguish on the face of German astronaut Ulrich Walter is well deserved. The lower half of his body is in an airtight chamber in which the air pressure has been lowered, causing his blood to rush to his legs. Astronauts who become too dizzy during this procedure are dropped from the program.

At Tanegashima Space Center, Japan's largest launching site, an H-1 blasts off, carrying a weather satellite into orbit. Ressmeyer has photographed rocket launches in four countries; he has also sat through long nights of silence at observatories, waiting for the perfect shot. Everywhere he went he found scientists forging friendships and professional contacts across national boundaries. "They are part of a world community," Ressmeyer says. "They're visionaries."

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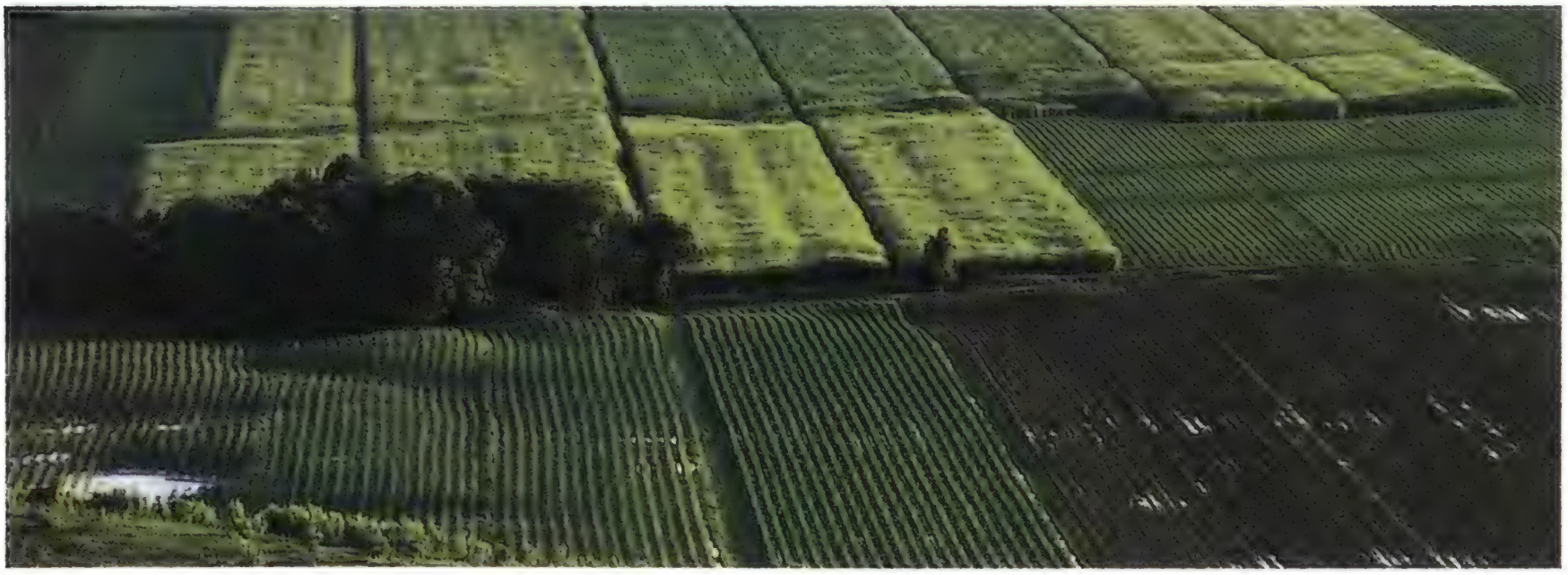
By Edwards Park

Way Down Under, it's revenge of the (yech!) cane toads

Multiplying madly and toxic too, Bufo marinus, *a New World interloper with a yen for travel, is on the march and out of control in Australia*



Queensland's verdant cane fields were intended as the imported toads' original destination, back in 1935.

But the newcomers disdained a diet of cane-destroying beetles and invaded new turf in search of tastier fare.

"Gross" is the word that springs most readily to mind. The thing is big, fat, ugly—and alive. It sleeps all day, eats voraciously, breeds insatiably and promptly poisons most of the animals that try to eat it. Not that many predators would want to. When it plops across the lawn at nightfall, it looks, in the words of a soberly scientific Smithsonian vertebrate zoologist, "like a mobile cow patty."

What you've got here is *Bufo marinus*, the marine toad, otherwise known as the cane toad, the giant American toad, the buffalo toad and "that bloody American monster." That last comes from an acquaintance of mine in Queensland, Australia, where *B. marinus* was introduced in a moment of madness 55 years ago, and where it has prospered so outrageously that it's become part of Australian folklore.

Cane toads are indeed American, but they barely qualify for U.S. citizenship. A few cane toads are found in the southern tip of Texas, their ancestors having crossed the Rio Grande. Some have shown up in Florida, where the critters were accidentally released by pet dealers. The toads are actually Latin Americans, occurring in Central America and South America, where there are more than 50 other *Bufo* species besides the *marinus*. Cane toads are the most common and widespread amphibians in this hemisphere.

The big guys have been getting along just fine in the damp tropics for thousands of years: plenty of bugs and other small creatures to eat; plenty of warmth in which to flourish and wetness in which to lay their thousands of eggs. Like all bufos, they secrete a latex-like, toxic fluid from the big parotoid gland at the back of the neck—nature's defense. The bigger the toad, the more poison there is. Bite a big bufo and you'll wish you hadn't. Squeeze one too hard in the wrong place, and its secretion can squirt out in your face.

One of the relatively few scientists to study cane toads is the Smithsonian's George Zug. He and his wife,

With an eye on ever-greener pastures, the cane toad has so far extended its range over 470,000 square miles. Advancing at about 16 miles a year, *B. marinus* seems bound for vast wetlands of northern Australia.

Thronging in hungry hordes, toads converge at night, hoping to gorge on bugs attracted by a floodlight.

Patricia, went down to the Institution's tropical research station on Barro Colorado Island in Gatún Lake, Panama, where the toads are remarkably adaptable, timing breeding for periods of high humidity. "If the climate is generally rainy and warm, they'll breed any time of the year," he told me. "If there's a distinct rainy season, they'll breed then."

On its native muck, the cane toad is an unqualified success, and has barely changed over the past 19 million years or so. After all, why evolve if you're already there? But then Man began playing God with *Bufo marinus*, and all hell broke loose. In the 1920s entomologists introduced the big toad into Puerto Rico's sugarcane fields. Beetle grubs were feeding on cane, and it seemed reasonable that the toads might eat them and save the crop. It worked.

In 1932, cane toads were shipped from Puerto Rico to Hawaii, where sugarcane is big business. They did such a good job that they were then settled onto other cane-growing Pacific islands. And in 1935 some were packed off to Australia.

In retrospect it sounds insane: Australia, with its strange, fragile biota, has suffered from every introduced species—rabbits, starlings, English sparrows, sheep, white men and sugarcane, to name a few. But the hard facts of economics can warp memories. And sugarcane is an important Australian crop.

Cane thrives along the coast of Queensland, the country's vast northern state. Driving north on the Bruce Highway, you begin passing cane crops only an hour or so above Brisbane, and you see more as you continue toward Townsville. Between there and the burgeoning tourist center of Cairns, you pass mile after mile of bright green fields. You thump over narrow-gauge tracks built to carry the cane harvest. Sometimes the smoke of burn-offs stings your eyes, and you smell the candy scent of burnt sugar everywhere.

Greeting cane toads with joy

Two similar Australian species of beetle feed on those sugarcane leaves, dropping their eggs on the ground around the stalks. When the grubs hatch, they eat the cane roots and kill the plants. The beetles became major pests during the Depression, hard to control even with costly fumigation. So in 1935, anxious cane growers greeted the arrival of the big American cane toads with joy. The migrants numbered 102—the same number as the *Mayflower* Pilgrims. Only one toad died in passage. The remaining 101 were put in a pond at Gordonvale, about 14 miles south of Cairns. Agriculturalists hoped against hope that the new arrivals, the only true toads in Australia, could find it in them to breed.

They could. A large female—she may grow to a

With a face not even a mother could love, *B. marinus* stolidly awaits the arrival of the next insect repast. The toad's voracious appetite pleases some gardeners, who prize the bufo's relentless pest-eating propensity.

length of nine inches and a width of nearly seven—deposits some 20,000 eggs, which the male fertilizes during "amplexus," the tactful scientific term for what toads do so well. With the help of his nuptial pads—not bridal suites, but the rough, callous spots on his enlarged thumbs—the smaller male grips the female and perches on her back, waiting, in apparently blissful patience, for her to lay her string of eggs in a pool, a stream, even a mud puddle. The eggs hatch in three or four days, and the water is filled with little dark tadpoles. These metamorphose into tiny black toadlets in a month or two, depending on climate.

This is the only vulnerable period in the toad's life. The eggs are poisonous enough to have given three heart attacks to a Sydney student who swallowed some not long ago on a dare. Tadpoles taste terrible and are noxious to predators. But toadlets, not having reached their full poison-producing potential, can't cause much harm. Also, as I can attest, the youngsters tend to gang together—easy pickings for birds.

Around Noosa Heads, Queensland, where my in-laws live, I've seen a patch of wet grass seem to come alive as hundreds of squirmy baby toads struggled through the grass stems. And I've seen a group of swamp hens—big gallinules, royal blue with red beaks—stalk slowly through the moving shoal of toadlets, so intent on feeding that they barely noticed me.

It took those first cane toads only nine days to fill their little pond with tadpoles. In a month or two, buckets of toadlets were being carried to the cane fields and turned loose. Salvation was at hand! Trouble was, the toads didn't like being in the cane fields. It was Queensland's dry season, and they couldn't find the shade they need to keep from dehydrating. Unfortunately, "the dry" is when the beetles are most active and the grubs are in the ground. As they matured, the imported toads ate some, but found it less trouble to dine in town, on lawns and garden plots.

Old-timers of Cairns remember when toads sat in a ring around lampposts at night, waiting for bugs to hit the light and drop. "They looked like a meeting of the town council," one said. Councilmen should not be flattered. With its big, down-turned mouth, the cane toad wears a perpetual expression of morose concentration. It reminds you of an income tax auditor going over your deductions. The animal seems hard to love, yet apparently some Queenslanders have managed it.

In 1987 an Australian documentary film by Mark

Contributing Editor Edwards Park takes off for Australia, the country he married into, whenever he can grab his golf clubs and go.

Doing what comes (very) naturally, two male cane toads make amorous advances on a female of their species.

Lewis, *Cane Toads: An Unnatural History*, combined solid information with hilarity and won well-deserved kudos. It drew viewers' attention to a 3-year-old girl who kept a big toad as a pet. Others have also found the beasts rewarding. According to the film's accompanying book, by Stephanie Lewis, cane toads seem to enjoy sitting on people's feet. "The toads used to climb over each other to get the best position on my bare feet," reported one woman.

Possibly the toads were trying to make love to the feet. Reportedly, they try with shoes. Also with fish, rocks, clumps of earth and horse droppings. A memorable scene in the film shows a male mounted upon a female that had been run over and was hardly in the most desirable condition. The male seems to have hung on, ever hopeful, for eight hours. The results of such sexual enthusiasm produced a density estimated at about 500 per acre. Compare that with their natural range on Barro Colorado, where George Zug found a density of about 65 per acre. "When you went for a walk at night," a Queensland friend told me, "you almost literally waded through them, and when they bred, the males made a trilling noise. With so many of them, it sounded like a diesel generator, off in the distance. Then you'd know there'd be more of the bloody things to wade through."

The overcrowded migrants ate just about everything. Cane grubs? Sure, whenever they could. Any kind of bug—harmful or not—was fair game. So was garbage, pet food, anything left outside at night. They'd tuck into honeybees, scarfing them down, then itch around uneasily while the bees expressed irritation at being swallowed. The film shows one toad gulping down a live white mouse, another stalking a Ping-Pong ball. When the mood strikes, adult toads eat their own toadlets—or hapless, undersized cane toads.

But few Australian creatures can eat a full-grown cane toad. Dogs and cats that try are apt to die. Often, dead snakes have been found with dead toads in their jaws. A drop in Australia's population of snakes pleases many people, but killing them off adds another tilt to nature's tenuous balance. Only one snake, the keelback, can prey on cane toads and get away with it.

Lacking the help of natural predators, Australians have tried desperate measures to stem the flood of toads. Running over them is popular because, when a tire hits a toad, the creature bursts with a popping sound similar to its mating call. Toad haters find this final "toad song" gratifying.

Less violent Aussies use a disinfectant called Dettol. Spotting a cane toad in her garden last February, my Queensland sister-in-law sped to her kitchen, returned with a small bottle and sprinkled a few drops on the bufo. It appeared to writhe a moment and then simply sat still—either paralyzed or dead. She picked it up distastefully by a foot and chucked it into the garbage. You can now get a squirt bottle of Dettol. Just spray a little on a toad and it will do the trick. I don't know where I read that—possibly in a flier mailed out by the Dettol people.

Ric Nattrass, a Brisbane wildlife ranger, hates Dettol. "I didn't study biology in order to recommend cruelty to animals," he told me. Yet he agrees that the toads should be disposed of whenever found. "Ducks and gallinules can cope with them," he said. "If they couldn't, we'd be seven meters deep. But this is a case where Man has got to be the main predator."

On the prowl with the toad patrol

Ric has set up neighborhood toad hunts in the Brisbane suburbs. "We listen at night for the mating call, then go out with sugar bags and pick up as many as we can in neighborhood gardens," he said. He guesses his team has cleaned out about a thousand toads from the 36 acres they've been patrolling.

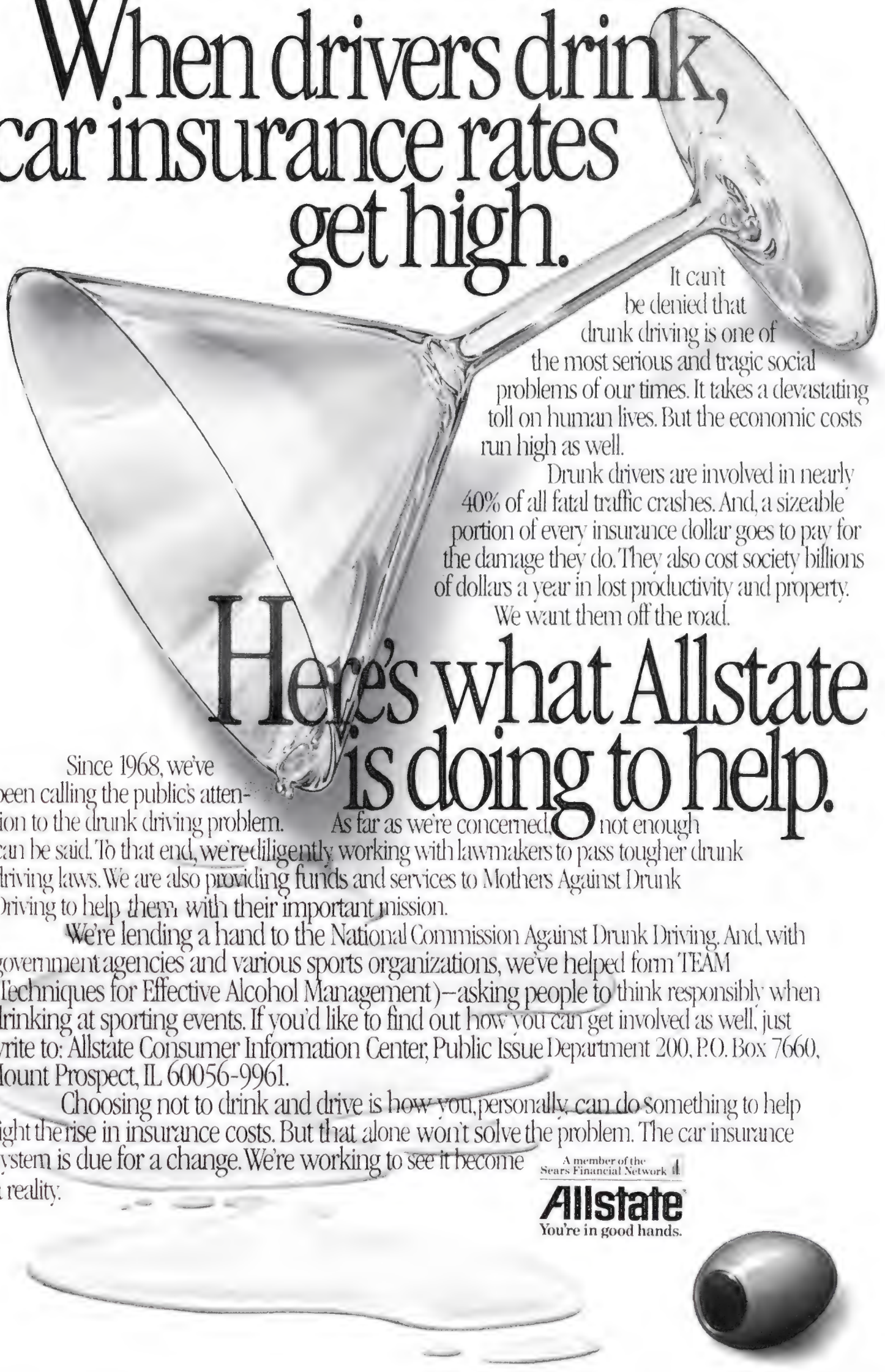
"What do you do with them all?" I asked.

"Straight into the freezer," he replied. "Cold kills them quickly and painlessly."

I told my sister-in-law, and she was outraged. "The freezer! Right in there with the ice cream and the frozen veggies? Not likely!"

Nature itself is finally reacting in Queensland. "The number of toads is down, around here, and they're not as big," said a ranger at Noosa Heads National Park last February. He agreed with Nattrass that some birds are beginning to eat them. "The butcherbird has learned to flip an adult toad on its back and peck its belly, where it's harmless. We think rats do that, too. Right around here we've found dead toads that have

When drivers drink, car insurance rates get high.



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been carried up into banana trees and left there with their insides eaten out. Looked like rats to us."

In her book, Stephanie Lewis says that tough young cane cutters in the sugar country sometimes tossed cigarette butts to the bufos. The toads would snap up the still-lit stubs and gulp them down. These days, said the ranger, some young acid heads smoke the toads. They crumble the dried skin of road kills into cigarette paper and light up. "I guess it's cheaper than pot."

"What does it do to the kids?" I asked.

"Don't know, yet. Probably kills 'em."

I've heard since that teenagers have also tried licking toads to get a fast high. (Apparently, this quest for sensation has spread to Florida as well, where bufo licking has caught on among high school students.) The Queensland Police reacted to such experimentation by declaring the toad secretion, bufotenine, a dangerous drug. As for eating them, Stephanie Lewis included recipes for gourmet toad legs—after thorough removal of the skin—in her book. These were recently jumped on by an Australian zoologist as lethal: "Even with the skin carefully removed, the legs could still contain enough poison to cause death."

In 1947 Australian scientists came up with a really effective chemical spray for sugarcane grubs. As for the toads, researchers have long been kicking around the idea of a virus to get rid of them. One succeeded in killing toads, but also infected a native frog. For a time government funding ran out, but now scientists are back at work. Anyway, Australia is going to be very slow to introduce anything else, ever again.

For the royals, a toadskin-bound book

Some people are finding uses for cane toads. Since bufotenine slows the heart, while increasing blood pressure, Chinese doctors reportedly use it in preparing patients for coronary operations. Craftsmen use the skin as a substitute for that of the endangered crocodile. A toadskin-bound book was given to Prince Charles and Lady Di as a wedding present.

The toads have even produced a profit. Because their innards are clearly distinguishable, they're favored subjects for dissection by students. Many are sold as anatomy "textbooks." The city of Ingham, in Queensland, used the money from the toads to help pay for an old folks' home, known locally as "Toad Hall."

In biological parlance, the toad population has "crashed" in Queensland. But the amphibians haven't died off. Instead, they're migrating. They've invaded the northeastern corner of New South Wales—about as far south as they'll get because of the growing cold.

Up in the damp, tropical far north, they're clumping into the Northern Territory at an alarming rate. Conservationists foresee the destruction of one of the world's great tropical ecosystems as cane toads kill off carnivorous mammals, lizards, snakes and birds, and even threaten crocodiles. Nothing, at time of writing, is stopping them.

Even toad's capacity for spewing poison from its large parotoid gland (above) does not alienate everyone. Toad fanciers, like this young owner, claim that bufos possess a certain charm and keep the beasts as pets.

My own most successful fieldwork with Noosa's cane toads took place, happily for me, on the golf course at neighboring Tewantin. It's a beautiful course, winding between some swampy areas rich in birdlife and obviously perfect for toad breeding. Whenever I headed for it, my sister-in-law would remind me to practice my iron shots on any toad I came across. But I saw nothing until one morning when she came along to put my golf to shame. On the dogleg fairway of the second hole we saw a bird fluttering above a lump on the cropped grass, diving to peck, then flapping up to try again.

"Come on," said my sister-in-law, grimly clutching her 4 iron. "That's a cane toad."

She strode up, shooing the bird away, and we both stared at the big, warty, khaki-colored beast. Its paws were widespread, an obvious reaction to attack. It rolled its warty eyes up at us in baleful defiance. "Maybe the bird was trying to flip it," I said. "Maybe it was a butcherbird."

"I think it was a maggie," said my sister-in-law. (That's Australian for "magpie." They probably flip toads, too, but who knows?)

We stared at the toad, and my sister-in-law prodded it with her golf club. "Go on," she said. "Take a swing at it."

"I'm not going to take a swing at it," I said. "You do it."

"Echhh," she answered. We wandered off to get on with our game. I looked back at the toad. It had resumed its trek across the fairway, a series of short hops, taken with painful deliberation as though each was a mighty effort. I checked the direction it was moving. Northwest. Straight for the glorious wetlands of the Northern Territory. God help the crocodiles!

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HONDA

The Accord

Outstanding for its color and brilliant distortion, *Myself* is by 7-year-old Bilgundi Gurydatta Mallinath.

By Israel Shenker

Winsome, weird and wonderful—art made by children

In Oslo, the only museum of its kind in the world is devoted solely to promoting the seemingly infinite creativeness of the young

This museum has nothing in a glass case, nothing remote or sheltered from touch. In Oslo's International Museum of Children's Art, what a feast of imagination and feeling and color! The walls of blue or green or burgundy or even white are all but covered with art, from infant's eye level to topside giant's perspective. One large wall is crammed with animal paintings. A yellow-green mouse with big black spots is eating green cheese—the work of a 13-year-old Argentinian boy. A 9-year-old Indian youngster has daubed his painted elephant with red and green.

"Our ambition here is to be the Louvre of children's art," says Rafael Goldin, the museum director whose adult dream has taken childhood's shape. "Children see that a museum can mean joy and color. If their first visit is to a boring, dusty museum, children will always associate museums with dusty and boring."

This small-scale Louvre positively kindles joy, even euphoria, thanks to a collection of about 100,000 works from some 150 countries. There are even two paintings by 17-year-old Albanian boys—the gift of Albania's envoy to Stockholm, who sent the works along with brandy (not exhibited).

Muiz Chaudry, a 10-year-old Pakistani boy who lives in Norway, painted a tree series: women's figures with arms as branches and blooms, man-tree and woman-tree stretching limbs toward each other, heads of mother and father on trees with leaf bearing large child's head. A 12-year-old girl painted *Skilsmisse* (Divorce): mother and father at opposite sides, each

Alla and Rafael Goldin are surrounded by children's art at home. Rafael, a Russian filmmaker who went on to Norway, became interested in art made by children while doing film of children's views of their fathers.

pulling at an arm of the child, who is about to be torn apart. Other family scenes reflect changes in society: while one Norwegian girl, age 12, drew *Mother Always Has to Stay at Home While Dad's at Work*, another, two years her junior, executed *Mother Works in a Sausage Factory to Earn the Same Money as Dad*. One huge painting was done with paint sprayed by finger from a toothbrush. A 7-year-old boy depicted Jesus waving from his wooden cradle, with large, round baby face.

One room is crammed with dolls and other figures, many of them made by children—wooden dolls, knitted dolls, crocheted dolls, ceramic dolls, rag dolls, fiber dolls, painted dolls, sailing dolls, dancing dolls, happy dolls, exhausted dolls, even warrior dolls. In addition: furry animals, smooth animals, inquisitive animals, contented animals, prowling animals, sacred animals. Tiny trapeze artists hang upside down. Dragons and trolls abound.

Above an arch between two rooms, 15 feet from end to end, is a work titled *From morning to evening*. People and animals go about their work from predawn at the right to darkness at the left—the masterpiece of a 14-year-old Indian boy.

On a black background, a young Turk has painted a large human figure and, instead of placing it within a landscape, has enclosed the landscape within the figure. Here are trees and houses and apartment buildings, mosque with minarets, railroad line, bridge, reservoir, farmer's tractor. All life is within the person, and everything beyond is darkness.

One section is labeled "*Ved livets kilde*" ("The source of life"). Three Argentinian teenagers collaborated on a large portrait of a woman divided by three broad lines across her body, symbolizing forces seeking to destroy nature. "Ninety percent of the works show the beauties of nature, and only 10 percent show crisis and problems," says Goldin. "Children are used to seeing and creating the positive side—flowers, plants, trees, sky, heaven. We should focus more on what children do, because when we become adults we spend so much energy trying to recapture childhood. If we preserve the quality of the child this will help us through the hardest strokes life can give. If we have the child's faith, even the impossible is possible."

Rafael Goldin was born in Kiev 70 years ago and was brought up in Moscow. When he was about 12, his

Photographs by Julian Nieman/ Susan Griggs Agency

Deeply absorbed, a group of schoolchildren visiting museum are drawn into discussion by director Goldin.

Some pictures hang at tots' eye level. Says Goldin: "The first meeting with exhibited art is crucial."

father deserted the family. "I spent many years compensating for what I didn't get from my father in those years—to feel secure and whole. Family is not society's invention—it's primarily biological."

Young Rafael tried to express his feelings through drawing, but had so little talent that he cried in frustration. He decided to create art in film and gained a prized admission to the State Institute of Film Education, studying under masters such as Eisenstein. During World War II he completed his training by serving at the front as a one-man film unit. Then, over the course of several years, he directed about 50 documentaries as well as 4 feature films.

In 1973, thanks to the Soviet government's desire to improve its image, a sudden exodus of Jews was permitted. Among them was Goldin—who left with his wife and 7-year-old son. "For once there was an advantage to being Jewish," Goldin says.

His wife had a married sister in Norway, so the Goldins went there. Four months later he and his wife separated, then divorced. His wife got custody of the son. "I couldn't speak a word of Norwegian," Goldin recalls. "I had lost my country, culture, language, wife and son. And I was alone. It was the worst crisis I had ever experienced. But I had managed to leave the Soviet Union, I had escaped from a gigantic prison. Why should I let my life be destroyed? I grabbed a Norwegian-Russian dictionary and began to study. I threw myself into this study as I had for each new film into a new subject. Short but intense. The essential question was, 'To be or not to be.'

"After two months I could speak about film plans with film people in Norway. When people helped me by writing letters applying for money, they'd always write 'In a very short time he achieved a fantastic ability in Norwegian.' Eight months after arriving I began shooting a film. Under Norwegian circumstances, that's incredible speed."

The first film was about a Russian émigré poet. In 1977, for his next film, Goldin wanted to portray children's views of father. For two years he had struggled unsuccessfully to win access to his son, and as a result of this the subject obsessed him. He began traveling to schools all over Norway, having won the cooperation of Ase Gruda Skard, an eminent child psychologist. "When I used her name, all doors opened. 'I need your help' were often my first words to the children. 'Because I want to make a film about the relations between father and child. I don't think grown-ups know what you think. I want to make the film with you. We adults make films for children. This time, children are making a film for adults.' "

Israel Shenker writes on a multitude of topics from his home near Glasgow, Scotland. In September 1990 he wrote for SMITHSONIAN *on Agatha Christie.*

Those with artistic talent worked seriously, with concentration. For them it was not a game. "I was overwhelmed by the responses of the children. Some cried as they painted. Some expressed anger and frustration. Some just sat quietly for a long time, thinking intensely. I also observed their happiness when they succeeded in expressing what they felt." A 3-year-old painted *My Father is Angry.* Another boy drew a large figure of white outline and a small figure just below. The large figure was cut off at the top of the head. "Like Eisenstein taught," notes Goldin. "If you portray a figure cut off at the top of the head, it concentrates attention on the eyes."

Planning a book as well as a film, he kept the artwork, and within two years he had a trove of children's art. He also collected a wife, Alla, an émigré Russian physician he met in Germany, and her son and daughter. She passed the exams allowing her to practice in Norway and began working for local hospitals.

In 1979 King Olav V opened an exhibition of the children's art in Bergen. Goldin wanted to exhibit children's art at Oslo's National Gallery. "The director wouldn't talk to us. He laughed at us. I was told afterwards that to be recognized you must first earn a reputation abroad."

The next year the art was exhibited in Vienna, then in other foreign cities. It went to the United Nations in New York. In Paris the exhibition at UNESCO was opened by explorer-adventurer Thor Heyerdahl. He was pleased to hear that while he worked on the childhood of civilization, this was the civilization of childhood. In 1983 children's art was shown at Oslo's Henie-Onstad Art Center and drew 45,000 visitors. "More than for Picasso," says Goldin, smiling mischievously.

"Paintings on the beds, on the sofa"

He gathered more art on children's views of mother, then on the child's view of work. "For us, work is about earning money," says Goldin. "For children, work is important for life, work is wonderful and romantic. Children can give us the spiritual sense of what we do."

The Goldins were thinking big and living small. Their modest apartment overflowed with the paintings. More arrived from friends abroad and from embassies in Scandinavia. "Home was full," says Goldin. "Paintings everywhere. The paintings didn't belong to us. We belonged to the paintings." "It was impossible," Alla Goldin agrees. "A table we could reach only on two sides. A closet we couldn't get into. From floor to ceiling, paintings and more paintings. Paintings on the beds, on the sofa. No room even to sleep."

The solution seemed even more impossible. If the Goldins could establish a museum for children's art, they would then have room to live. "Where will you get the money?" people kept asking, and the answer was not easy. For 70 years, Norwegians had been discussing the idea of a new national theater, and they still didn't have the money. "I'm not going to live another 70 years," said Goldin. "I'm in a hurry. We decided to act first and find the money later. Otherwise we would have waited forever."

In 1983 they saw an ad for a large house in Oslo costing 2.1 million kroner—there are about 6.5 Norwegian kroner to the dollar—and decided to buy it. The Goldins asked Hermann Gmeiner, their good friend in Austria, for help. Gmeiner ran SOS Children's Villages—a worldwide establishment of homes for orphans. He had commissioned Goldin to make films about the villages, and he agreed to stump up 700,000 kroner for a down payment on the house. A mortgage of 1.6 million kroner provided the rest—and money to get the museum started.

The Goldins moved in and slept on mattresses on the floor. "First the paintings lived at our house, then

Museum stairwell was converted into a fantasyland, an amazingly vivid jungle inhabited by exotic-bird art.

Singapore girl Lau Chooi Ping, 13, toured India, admired Mogul art, painted striking *Battle of Srinagar.*

The work of Katia, 7-year-old French girl, graphic stick figures dance and skitter through ambient space.

we lived at the paintings' house," says Alla Goldin, who got more and more involved. She took over the job—doing it herself—of converting house to museum. That meant covering much of the wall surface with rich colors. It meant converting the main stairwell to a jungle, with ivy climbing everywhere, birdsong added. It meant preparing the paintings for display. In a room converted to a workshop she covered each picture with a transparent, nonreflecting plastic film called Filmomatt, put each painting into a passe-partout and then framed it.

When she was not at the hospital she was working in the museum. This left little time for sleep. The diagnosis was simple: she had to choose between medicine and museum. She gave up medicine. "We treat many, many people in this place—treat them with children's art," she says. "She's the one who does all the work—a doctor of medicine," says Goldin. "All I do is talk."

"I was used to having to get money from the state for my films in the Soviet Union," he explains. "The difference is that in the Soviet Union it was not advisable to seek support for unpopular projects; you'd find yourself in contact with the KGB. In Norway you simply find people from different parties."

In Norway, which does not have a tradition of private sponsorship, Goldin pestered officials for funds. He got some from the Foreign Ministry for traveling exhibitions. And he asked for more from Lars Roar Langslett, who was Minister of Culture and is now head of culture for the Oslo municipality. "Rafael has the privilege and drawback of being a Russian by birth, so he's in the Byzantine tradition," Langslett says. "When people say no, he pretends not to understand Norwegian. There are specific rules which he thought could be ruled out. But there was certainly a lot of sympathy for him in the government. He operates skillfully through our Norwegian system with no great respect for our bureaucratic traditions. He had the impression that ministers had money in their offices and could take it out and give it away like an old king. It's amazing that he got money so quickly."

In 1986 the museum was ready to open, and Prime Minister Gro Harlem Brundtland agreed to do the honors. She told the invited guests that these strange Russians had become part of the state budget in two years. It was the first time in Norway's fiscal history that that had happened.

"I talked to Gro," Goldin recalls. " 'There are no private alternatives,' I told her. 'It has to be the state. If I can't get help here I'll have to emigrate again. I'm convinced that with your charm and warmth and daring you will prevent that.' The next day another woman called. It was Kirsti Kolle Grondahl, then a member and now president of Parliament, who told

Says Rafael Goldin of the work: "A fantastic idea; to draw the figures as musical notes . . . they dance."

Path in the Woods, by Veda Atmanand Diwadkar, 16, of India, is an accomplished, sophisticated work of art.

me Gro said to help and asked, 'What is it all about?' " Almost before she had time to find out, she found herself on the board of the foundation set up by the Goldins and spreading the good word in Parliament.

"We got a lot of professional resistance," Rafael Goldin says. "People who know about art said it was crazy to have a museum for children's art. They tried to influence politicians to avoid giving us money. The art professionals didn't agree to our calling it art. 'Art' was reserved for adults; 'artists' were people who had been to the academy. The second group of enemies were child psychologists. They feel they have a monopoly of everything to do with children. They were irritated. Most of them don't have the faintest idea what art is. . . . They are in ministries where I applied for funding. Now both groups of opponents have been silenced. They can visit the museum and see for themselves."

The national government gives 1.76 million kroner a year toward the museum's annual costs of 3 million kroner (which includes interest of 250,000 kroner for the mortgage). More comes from admission charges—15 kroner per child, 25 per adult. An exhibition on nature and the child was subsidized by the Environment Ministry. The Consumers' Ministry helped; so did a development agency. Statoil, the nationalized oil company, gave 25,000 kroner last year, 75,000 this year. Last year the museum won a share of the annual Lego prize—330,000 kroner, which went to renovating the large attic, putting 17 windows into what had been a dark, uninviting area.

"They have made a marvelous thing out of the museum," says Langslett. "In former centuries, children were mostly looked upon as people who had not yet grown up—like an immature sketch of a grown-up. I think our century has gone a bit beyond that, and is more apt to recognize the intrinsic value of children's words and imagination and gifts. I suppose there are some art critics less prepared to accept children's works as art. In many of the things Rafael has exhibited you see artistic value without artistic training—perhaps because most children have artistic ability which dries up when they grow mature. I'm sure even grown-up people have a lot to learn from the museum."

"To respect children is very important," says Goldin. "This, people don't understand. People didn't look at the creations of childhood. It was a blank space on the map. Children may not be able to speak to us in our language. But *their* language is wonderful. What they express is a stage in our lives that we can't return to, and at the very moment they experience it. These are the originals.

"Among the youngest you find irritation and frustration. They're not respected as individuals. They

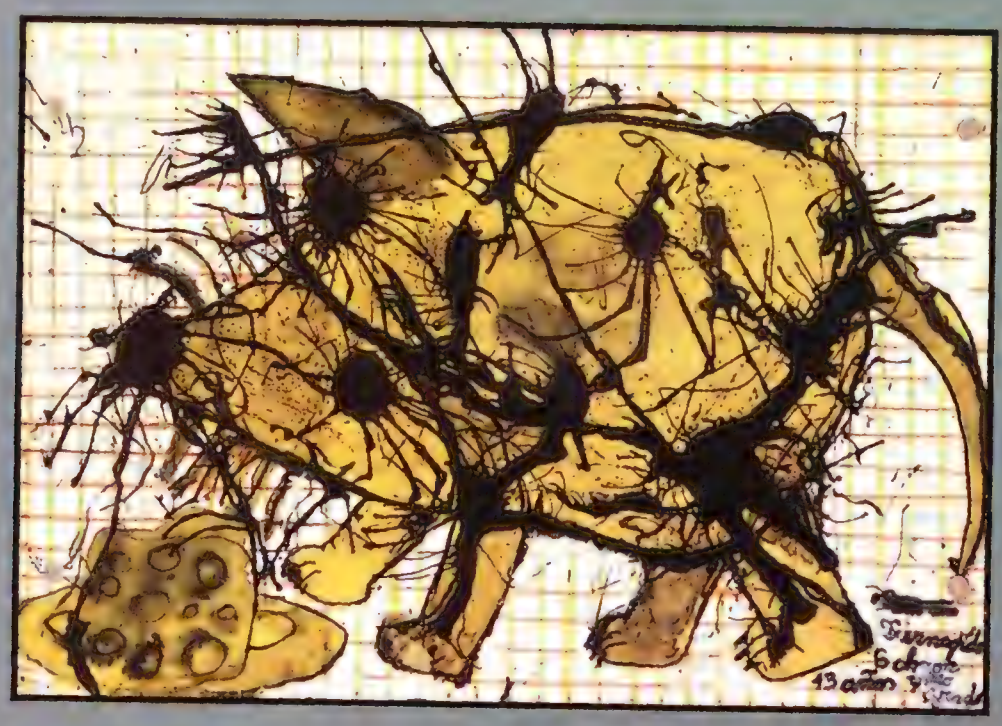
Anonymous work, *A Cat,* is by an 11-year-old who sums the animal up.

Elegance, energy and imaginative design distinguish the painting *A Field,* by Dupa Deepanie, 13, from Sri Lanka.

Jesus is signed "Walker Blankhship," 7, USA.

From Thailand came this trio of figures enigmatically titled *Compel,* by an 11-year-old.

The Mouse is Eating Cheese is by F. Shoch, 13, Argentina.



Painting by an 11-year-old from Mongolia is untitled, but the essence of happiness is here.

Three-year-old Michiru Shioji of Japan expressed an unmistakable image in *My Father is Angry.*

Shruty Das, 11, India, did moody *Portrait of My Brother.*

Michaela Prochazkova, 7, a Czech, shows motion in *Small Music Boy.*

In *Destroy the World* by Thai boy, 14, stumps signify adult abuse of Earth.

A Picassoid piece, bike made from scrap wire is the creation of a 10-year-old boy from Rwanda.

have this burden to carry through childhood, and then at age 13 or 14 have a rage to upset everything. Had they been respected it would not have happened. The fact that it's children who have created this art makes the children who come here more interested. It's not something we push onto them. We inspire the children by showing them how good they can be at their age. It gets them going. Teachers often tell us they're surprised when the children start painting as they never did before. After school visits, children bring their parents and grandparents, and act as guides for adults. This has consequences for bringing up children. Many adults say they'll begin by talking to children in a different way. It can change the relationships between generations."

The museum has one room—festooned with art, naturally—where children who have seen what others can do try their own hand at painting. "Not all children are artists," says Goldin. "Not everything they produce is art. But we discover all the elements that exist in good professional art. They produce Cubism, Expressionism, Symbolism, Pointillism, naturalism, abstraction. We have found masses of Picassos and Rembrandts and Chagalls among the children. There are visual Mozarts here. We had an exhibition three years ago of Chinese children's art. There was a painting by a 3-year-old boy of an ox—all done with a single line. I thought it was lucky Picasso was dead. It would have been too much for him.

"It's not a question of stages, of clocks going at the same speed for each child," explains Goldin. He elaborates: "Some children are great artists at 5 or 7 and then it disappears. Some start in their teens. It's the opposite of the accepted belief. You do not grow to have an identity. You start as an individual with an identity and then become a mass creature. With age you lose your identity."

The visitors books bear graphic testimony. Every language seems to have an equivalent of the Norwegian "*fantastisk*," which appears with overwhelming frequency. "A fantastic opportunity to see the world's future great artists," concluded one visitor. "Your museum was *marvalles*," wrote Britain's Yael Elgar. Added Simon Hill: "Well worth the drive from New Zealand." The ultimate flattery was that some of the child visitors drew in the visitors books. One young American was so inspired that with unique, wobbly artistry—his father said that it was the first time he had seen his son write his name—he signed himself: THOMA.

Now the Goldins have an apartment about five minutes from the museum, with room to sleep—though this may not last. The place is filling with children's art, and Goldin likes to display it to visitors, talking as he moves about the rooms. "Korea, 5 years," he says, pointing to one wall; "7 years, Canada; 12 years, Sri Lanka. Canada, very interesting, 12 years. This is from America, 14 years." Alla Goldin, working in the kitchen, corrects: "15, Rafael."

If Goldin can pester more money out of the ministries, the museum will expand and be able to display the surplus from home and storage spaces in the museum itself. There are plans for a computerized catalog, for an underground theater and exposition space with a garden aboveground, and for a puppet theater.

The Soviet ambassador wants to have a show of the art in the Kremlin. Rafael Goldin would be only too pleased, if only as a starter. "Just as each country has its national museum, we would like to see such a children's museum in each country."

It could easily be a mouse, but Gregor Goricac of Yugoslavia, who is 5, says it's a squirrel. Of course.

GREGOR

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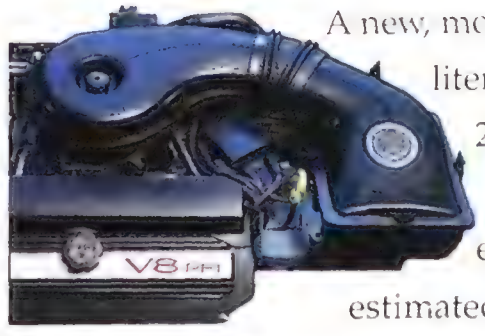

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By Barbara Jepson

It is no disgrace to be second fiddle to a Stradivarius

When it comes to crafting violins, Joseph Nagyvary bows to no living man. He emulates the renowned Antonio Stradivari himself

Joseph Nagyvary heads north on Agrimony Road, away from his office in the sleek new Biochemistry Building at Texas A&M University. Ten minutes later, the 56-year-old professor turns his white Toyota onto a dirt road and pulls up at a rundown agricultural field station on the edge of the sprawling campus in College Station, some hundred miles northwest of Houston. A herd of Hereford cattle grazing in a nearby pasture duly notes his arrival.

Here, in two cluttered, white frame buildings, Nagyvary oversees research into, no, not beef production, but violins—and extremely unconventional violins, at that. The Hungarian-born chemist claims that his instruments come closer to duplicating the sound of a Stradivarius than anything made since 1800. "We can prove," he declares in his heavily accented English, "that violins have been made with the wrong wood and varnish for the last 200 years."

Those assertions are enough to send stringed instrument aficionados into a rage. For centuries, violin experts have debated the secret of the renowned Cremona school of instrument makers (SMITHSONIAN, October 1983), founded by Andrea Amati during the mid-16th century and brought to perfection by Antonio Stradivari and Giuseppe Guarneri "del Gesù" in the early 1700s. Was there something special about the wood they used? The varnish? The filler? The thickness? No one knows for sure, and in an attempt to find out, violin makers have tried everything from baking the raw wood in ovens to burying it in sand for years.

Now along comes Nagyvary, the latest and most controversial figure to enter the fray. One of his first creations had a golden hue imparted by soaking the wood in diluted urine. "He put a bucket in the men's room," recalls a co-worker, "and posted a sign saying 'Please contribute generously to violin research.'" Later, he developed an unorthodox method for hardening the wood via the application of chitin, which he obtained by boiling shrimp shells in a potassium hydroxide solution.

Other violin experts roll their eyes when Nagyvary starts talking; but in fact, employing the latest scientific equipment, he has identified some important differences between 18th-century Italian violins and those made today. First, he has determined that the wood of the older Italian instruments contains more open holes in its cell walls. It also exhibits an unnaturally high sodium content. This leads Nagyvary to theorize that the Cremonese masters used wood floated downriver from the Alps to the saltwater lagoons of Venice, where microbial degradation over prolonged periods opened the holes, rendering the wood lighter, more resonant and more permeable.

Should druggists get some of the credit?

Nagyvary has also examined chips of varnish taken from a Guarneri cello and an unidentified viola and found that they contain finely ground minerals, such as quartz, calcite and gypsum. These substances may be what give the instrument surfaces their gemlike luster; they could also have the effect of filtering out high-frequency noise. Above all, their presence suggests to Nagyvary that 18th-century druggists, who prepared and sold varnish mixtures of this type in their shops, deserve more credit for the appearance and sound of these matchless instruments than heretofore received. "Most of Stradivari's violins," he says in a dry, hoarse voice, the legacy of a paralyzed vocal chord, "were pretty damn good, but that was not due to great insights into physics and engineering."

Based on his research, Nagyvary has developed his own wood-treatment process and a varnish formula that incorporates many of the finely ground minerals identified in the varnish chips he analyzed. During the past decade, more than 30 stringed instruments have been carved from his specially treated spruce and maple by craftsmen in China and Hungary, then returned to him "in the white" for acoustical adjustments and varnishing. He has also garnered a mountain of pub-

Iconoclastic chemist displays some of his instruments. Body of viola at right is made of 4,000-year-old cedar.

Photographs by Michael Melford

licity. The *New York Times*, *People* magazine and ABC's *World News Tonight with Peter Jennings* are among the media that have profiled him, and last year he was featured in a *NOVA* program on the meaning of music. One upshot of all this attention is that Nagyvary is now deluged with letters from individuals who mistakenly think they've discovered a Strad in the attic.

A short, urbane fellow whose dark hair is flecked with gray, Nagyvary is best known in biochemistry circles for establishing the structure of the South American poison curare. That earned him a listing in *The Merck Index*, a reference for important natural and synthetic chemicals. He also worked for 15 years synthesizing substances for use in anticancer and antiviral drugs. Compared with those undertakings, his quest to solve the mysteries of the legendary Stradivari and Guarneri violins seems downright quixotic. It has made him an outsider among his academic colleagues and has raised the hackles of many professional musicians, dealers and scholars.

"Many things Nagyvary says don't deserve to be talked about," complains René Morel, head of restoration and repair for Jacques Français, the prominent New York violin dealer. Morel, the only man to whom many virtuosos will entrust their precious Strad or Guarnerius for repairs, resents the attention accorded a chemist over makers who have spent years refining their craft. Français himself is more diplomatic. "Some of what Nagyvary says has good logic," he concedes. "But he has new ideas all the time and makes claims which are not real. He should behave more like a scientist and less like a violin enthusiast."

Dealers, who obviously have a vested interest in selling the most expensive instruments, are not alone in their skepticism. In the tiny, tempestuous world of violin making, there are those who emphasize materials as the key to excellence, and those who emphasize structure and acoustics. Norman Pickering, an acoustical engineer, has researched vibration patterns in stringed instruments for more than 40 years at his sound lab in Southampton, New York. He calls Nagyvary "a charlatan." "In 1982," he relates, "I objectively tested two of his instruments and they were the strangest and poorest violins I had ever seen. I also gave him a piece of spruce to treat, and when it came back it had exactly the same characteristics it had prior to the treatment." Nagyvary contends that Pickering's spruce was so well seasoned, so dry, that it was impervious to the chemical treatments he was using at that time.

The ultimate arbiters, of course, are musicians, and so far only about a dozen actually own a "Nagyvarius." While their admirers are quick to concede that these instruments do not possess the exquisite tonal color and purity of a Stradivarius or a Guarnerius, they do believe they offer more for the money—Nagyvary's fiddles sell for $6,000 to $15,000—than much costlier models by many late 19th- and early 20th-century violin makers. Stephen Clapp, professor of violin in the Conservatory of Music at Oberlin College, is impressed

Like a side of bacon, instrument undergoes "smoking" to help preserve the wood and darken its color.

Plates show several of the steps Nagyvary follows in varnishing; like Stradivari, he uses an oil varnish.

by the "evenness" and "good-quality tone" of the violin that Nagyvary donated to that institution. "I find it much more responsive than, say, the typical [Jean-Baptiste] Vuillaume"—that is, an instrument by the eponymous 19th-century French maker whose fiddles have sold for more than $50,000. Fritz Magg, who headed the string department of the School of Music at Indiana University for 32 years and owns a 1698 Stradivarius, uses the cello he purchased from Nagyvary last winter in professional concerts. And Zina Schiff, a young violinist who studied with Jascha Heifetz and Ivan Galamian, was pleased by the response of the Israel Philharmonic string section when she used a Nagyvary in her recording debut with them in 1988. "They all wanted to know what kind of instrument I was playing," she recalls. "They were impressed by its power and tone."

The attention Nagyvary is receiving these days reflects a growing interest in modern violin makers. As prices for the best Stradivari and Guarneri instruments soar into the million-dollar range, demand for top-quality contemporary instruments increases, drawing new blood into this once moribund trade. One of the most respected contemporary makers is Luiz Bellini, whose beautifully crafted reproductions of antique instruments are owned by such esteemed artists as Yehudi Menuhin, Ruggiero Ricci and New York Philharmonic concertmaster Glenn Dicterow. An elegant man with gray hair and a thick mustache, Bellini epitomizes the traditional luthier, or maker of stringed instruments. After a period of apprenticeship with an elder craftsman in his native Brazil, he came to New York to learn more-sophisticated restoration techniques from Fernando Sacconi, who worked for the late violin dealer Rembert Wurlitzer. Today, Bellini labors daily in a tidy, sunlit workshop on the second floor of a two-family house in Jackson Heights, Queens, creating six to eight copies a year of either the "Lord Wilton" Guarnerius or the "Baron Knoop" Stradivarius, which he sells for $15,000 each.

At the opposite end of the spectrum are the scientists and acousticians involved in violin research. Many of them belong to the 800-member Catgut Acoustical Society, a nonprofit organization founded by a Harvard

Barbara Jepson, who lives in New York City, writes frequently about classical music for the Wall Street Journal *and* Connoisseur *magazine.*

Outside Nagyvary's lab in rural Texas, blocks hold pieces of Sitka spruce submerged in chemical solution.

In lab, Glenn Bearden puts data from device scanning prototype plate in computer that cues milling machine.

physicist in 1963. Its permanent secretary, Carleen Maley Hutchins, is a science teacher turned violin maker who lives in Montclair, New Jersey. Hutchins has spent the better part of 20 years studying vibration patterns in violin "plates"—the top and back of a fiddle. Traditional violin makers tune the plates by ear, tapping the wood in strategic locations and modifying the wood thickness until it produces the desired tone. Hutchins does the same thing, but she also employs specialized electronic equipment to tune the plates even more precisely. She has used this approach to create a new, eight-piece family of stringed instruments, ranging in size from a seven-foot-high contrabass to a pint-size treble violin.

If the sizes of Hutchins' instruments are regarded as impractical by many musicians and dealers, Nagyvary's violins, on the other hand, are considered esthetically crude. He began making violins in the early 1970s as a weekend hobby and readily admits that his creations lack the beauty associated with fine stringed instruments. "There are plenty of people," he observes, "who are better at faking the look of antique fiddles down to the last dot and blemish. That's a certain art, but it has nothing to do with the sound."

It is 11 A.M. on a rainy Thursday in College Station. Inside a cement-floored room at Nagyvary's field lab, a slender reed of a man named Chen Guang-Yue is painstakingly carving a purfling channel. That's a shallow groove in the plate into which a decorative inlay around the edge of a violin is fitted. The plate was created at the lab by a computer-controlled milling machine. Down the hall, Nagyvary concocts his varnish out of such unconventional materials as pulverized quartz, amber and a pinch of ox bile. After the newly applied varnish has dried, the violins are tested by a computerized spectrum analyzer to insure the appropriate frequency response, or tone color. The whole process is a curious amalgam of technology and alchemy, science and art.

In 1988 Nagyvary received a $275,000 grant to develop a way to mass-produce affordable, top-quality stringed instruments in Texas. The milling machine, which became operational last year, is the result. Since then, a handful of staff members and students have created 20 instruments at the field station. Many of those violins will ultimately be donated to colleges and universities. Engineer Glenn Bearden (above), who programmed the milling machine, studied violin at Rice University's Shephard School of Music. "I saw how desperately young musicians needed a good instrument just to audition for a job," he recalls. "For an audition applicant to be considered seriously, he or she would have to have an instrument of professional quality. Such instruments cost more than many applicants can afford."

The violin evolved prior to 1550 from the pear-shaped fiddles of the Renaissance—the rebec and lira da braccio. By 1600, its basic design and measurements were in place. During his lifetime, Stradivari experimented mainly with three models—the one he inherited from his teacher, Nicolo Amati; a longer version that he subsequently abandoned; and the model used

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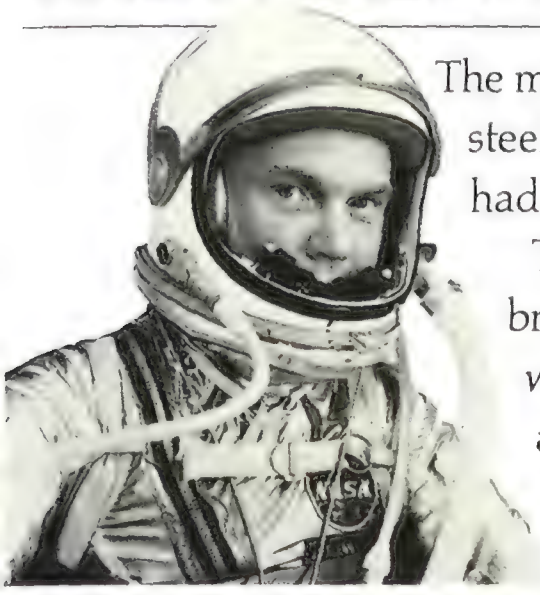

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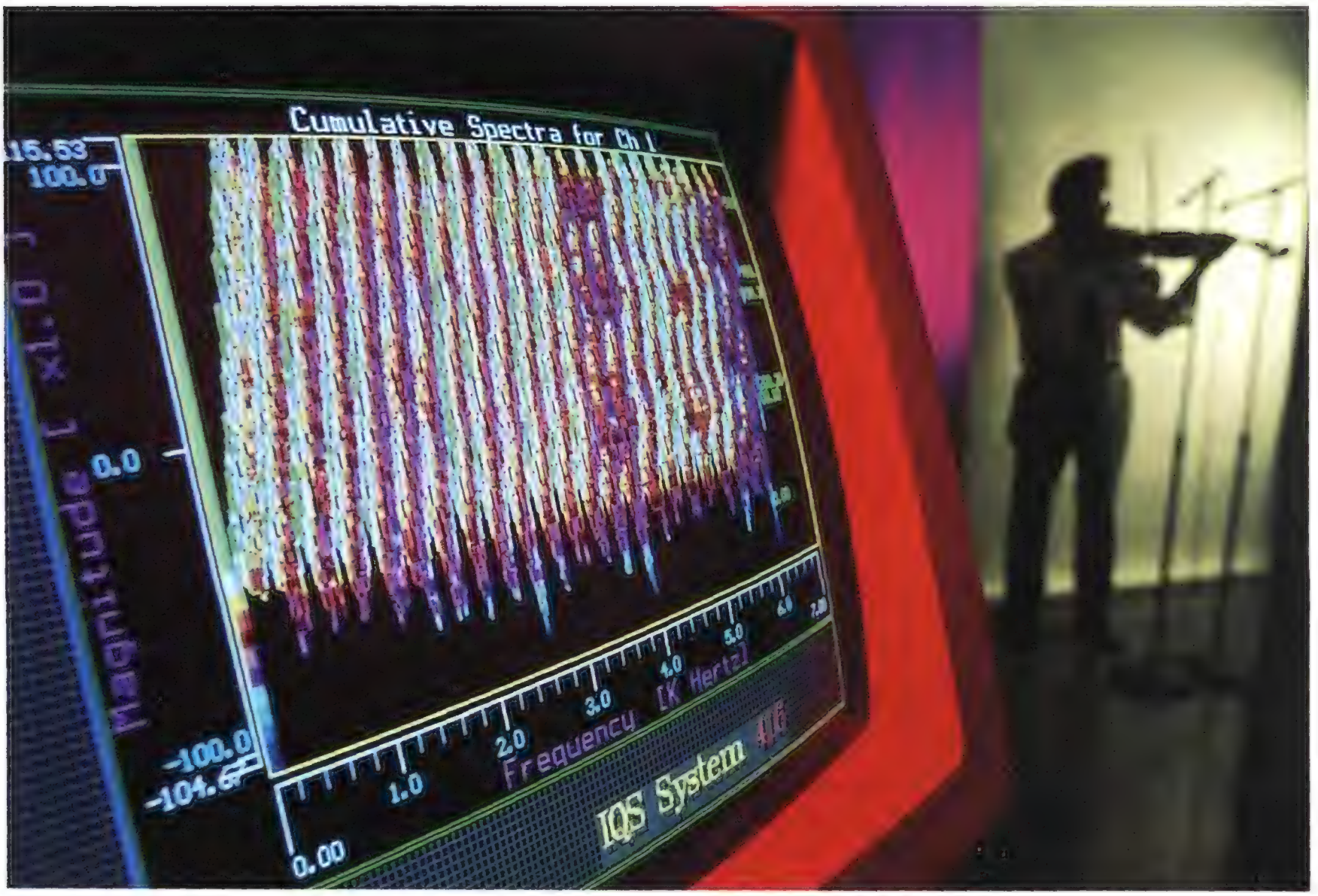
in his "Golden Period," from 1700 to 1720. Since then, any number of expert artisans have precisely reproduced the structural shape and parts of some of his approximately 650 extant instruments, but none of them have been able to duplicate the sound.

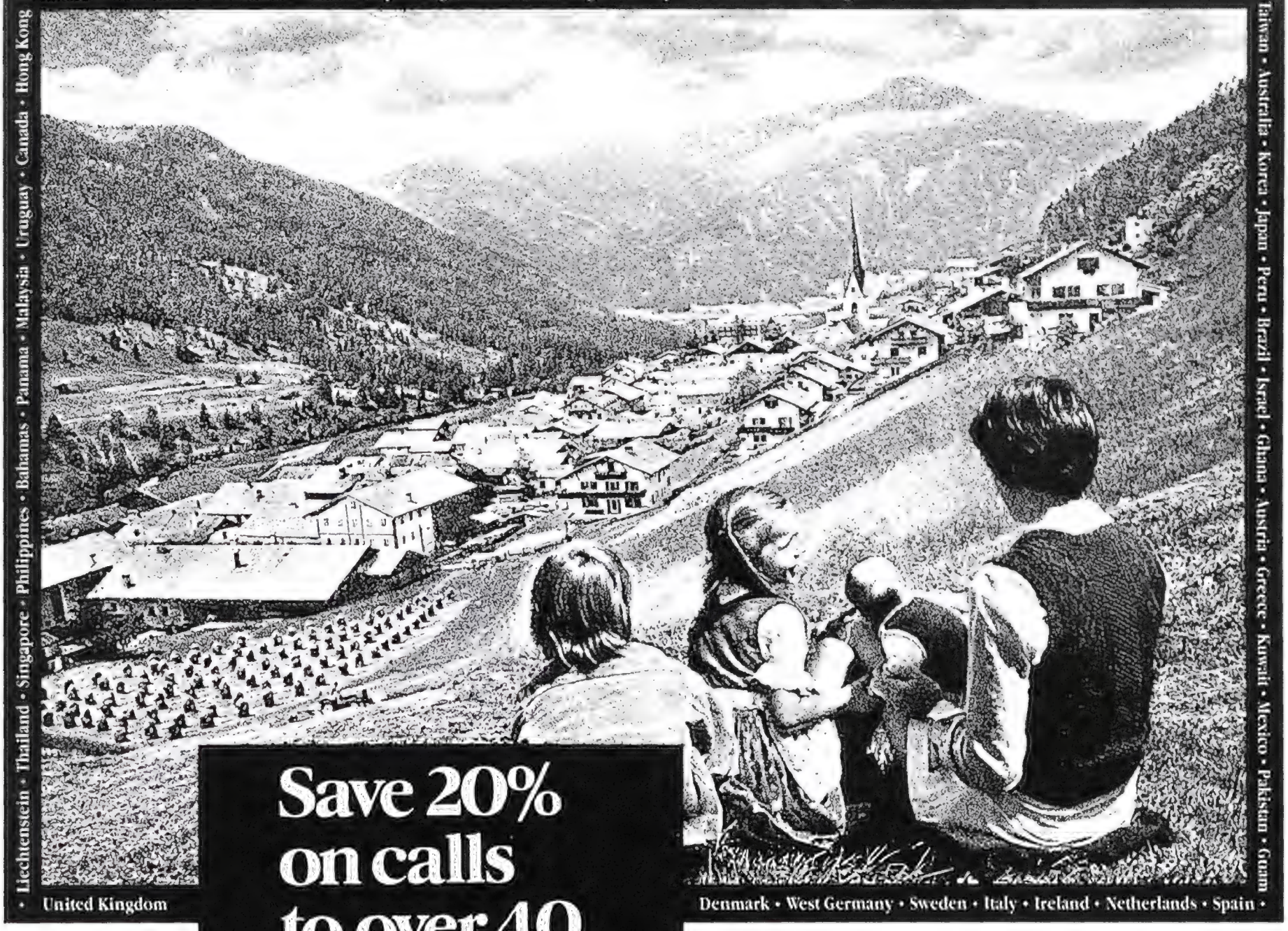
This has intrigued Nagyvary since childhood. "I was truly fascinated," he explains, "by one of the greatest puzzles in human culture: How come, in a high-tech age, we can't make violins the way simple, uneducated fiddle makers produced theirs? I thought that if I solved that problem, people would love me. Maybe they wouldn't erect a statue in honor of me in Cremona," he adds with a wry grin, "but they would be appreciative. I did not anticipate so much antagonism."

As an organic chemist, Nagyvary logically focused his attention on the materials used in violin construction. Once he had discovered a significantly higher percentage of open holes in the wood of 18th-century Italian instruments, he attempted to duplicate the effects of saltwater immersion. At first, he used green spruce that had been soaking in the salt water of Alaskan bays for several years. Now, he either boils dry wood until it sinks and then soaks it in chemicals and enzymes, or puts the wood in a high-pressure chamber for a couple of days to press in the water and enzymes. Both procedures, he says, have the same impact as hungry fungi and bacteria—they remove some of the gummy hemicellulose in the wood, permitting the flow of his chemicals between cells. By contrast, most modern makers use air-dried wood with the hemicellulose intact, which closes off the cell walls. This, according to Nagyvary, tends to give the instruments a harsh, piercing sound.

The saltwater immersion theory, the notion that Stradivari didn't make his own varnish, the technique Nagyvary uses to analyze old varnish—for these and other reasons, the iconoclastic professor's work remains anathema to many violin makers and experts. And the fuss over Nagyvary has helped focus increased attention on another contentious subject: How much of the reputation enjoyed by Stradivari and his noted contemporaries is sheer mystique? Today, owning a Strad or a Guarnerius has become a status symbol, the musical equivalent of driving a Bentley or a Ferrari. For much of the 18th century, however, instruments by



While Nagyvary (at right) plays one of his violins to microphone, sound spectrum analyzer (foreground) displays tone color. With every movement of bow or change in fingering, pattern on screen changes, too.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Student varnishes scroll of a violin. Because it holds strings tight, the scroll is made of maple, a hardwood.

Nicolo Amati and the Austrian maker Jacob Stainer commanded the highest prices in London auction rooms. According to *The New Grove Dictionary of Music and Musicians*, it was not until the late 1700s, when the virtuoso Viotti championed Stradivari's violins, and Paganini later favored Guarneri's, that these makers began to achieve the renown they enjoy today.

Some experts say this fame is no longer deserved. First, many if not most of these coveted instruments have been significantly altered. During the 19th century, their necks were slightly lengthened and narrowed, and other structural changes were made that enabled the instruments to project more powerfully over the modern symphony orchestra in large concert halls. Second, they have been affected by the vicissitudes of time. "Old wood," observes Stewart Pollens, associate conservator of musical instruments at the Metropolitan Museum of Art, "becomes brittle due to oxidation and other chemical degradation. On top of that, many Strads and Guarneris have been repaired to the point where they're sandwiches of old and new parts. So I don't believe that they sound significantly better than violins produced by the best modern makers." Pollens is an outspoken critic of Nagavary's work, but on this point they seem to agree. "Right now, out of the 650 remaining instruments by Stradivari," says Nagavary, "there may be 50 that are great concert instruments, 150 that are good, 100 that are average. The rest are valuable only as antiques."

Joseph Nagyvary acquired a taste for subversion early on. He left his native Hungary in 1956, the year of that country's futile uprising against Soviet domination. Over dinner recently at the local Hilton Hotel with his wife, Mary Anne, he recalled "mixing a Molotov cocktail and throwing it at a [Soviet] tank, but my aim wasn't so good." Sought by the military police, he fled across the Austrian border and ultimately settled in Switzerland. There, he worked briefly as a railway station janitor before entering the University of Zurich to complete his doctoral degree.

A wiry father of three offspring from a previous marriage, Nagyvary came to Texas A&M in 1968 after research positions with the University of Cambridge in England and the University of Connecticut. By the early 1980s, his appetite for medical chemistry had waned. "I got tired of spending my time creating drugs which did not cure cancer patients," he says.

The transition from medicine to music has not enhanced Nagyvary's prosperity. The focus at Texas A&M is necessarily its well-known programs in engineering, agriculture and military training. Although Nagyvary is tenured, he has not had a raise beyond cost-of-living increases for eight years. The money is in agricultural research, he laments, not violin research. His current hope is to establish a private, nonprofit research institute at the school, which would allow him to continue his studies and his violin making.

Ideally, his future research should involve collaboration with a variety of specialists—microbiologists, acousticians, violin makers and musicians. A more likely scenario is that Nagyvary will ultimately establish his own independent institute, which will enable him to further refine his production techniques and continue to donate his instruments. If his violins hold up well and keep on improving in tonal quality, he may indeed build a lasting legacy. That would be rewarding on more than one level. "I got more involved in violin making," he muses, "around the time I lost my voice for three months. That shakes you up a bit, especially if you love to talk as much as I do. Maybe subconsciously my violin making is a way of preserving some sound of myself—I can speak through musical instruments for a long time."

Shavings and tools of the violin maker's trade lie atop a plate emerging from Nagyvary-treated spruce wood.

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Foiled by mishaps, Ellsworth (left) and Amundsen received an ovation in Oslo after 1925 expedition. They tried flying from Spitsbergen to Alaska but got in trouble after touching down near the North Pole.

By Donald Dale Jackson

Lincoln Ellsworth, the forgotten hero of polar exploration

Everybody remembers Peary, Amundsen and Byrd. Ellsworth was just as intrepid, but he didn't have their appetite for self-promotion

Lincoln Ellsworth was a made-to-order American hero. Like his contemporary Charles A. Lindbergh, he was brave and independent, tough and resourceful, and modest to a fault. Like his other contemporary, and sometime rival, Richard E. Byrd, he was an aerial explorer who performed spectacular feats in the Arctic and Antarctic. In 1926 he took part in the first flight across the North Pole and the Arctic ice cap, from Norway to Alaska; in 1935 he made the first coast-to-coast flight across Antarctica. He claimed more than 400,000 square miles of Antarctica, much of it now known as Ellsworth Land, for the United States. Twice he vanished for weeks into the polar outback while millions tracked the ensuing search in headlines, and twice he emerged blinking and smiling shyly in the spotlight. Ellsworth always got through.

But the history books that chronicle the sagas of Lindbergh and Byrd rarely mention Ellsworth. Biographers, moviemakers and docudrama producers have neglected him; and his own books, low-key and somewhat awkward, are long out of print. The renown that both attracted and repelled him during his lifetime

Marooned 156 miles from the North Pole, members of the Amundsen-Ellsworth party packed ice for a takeoff attempt.

slipped away like an Arctic mist even before his death at 71, in 1951. His widow, Mary Louise Ellsworth, had not been interviewed in 40 years when she consented recently to talk to SMITHSONIAN for this article. Her reaction to a postage stamp (p. 188) that was issued in Ellsworth's honor in 1988 reflects her husband's arm's-length chariness about fame. "He wouldn't have liked the stamp," she says. Too self-promoting, too showy.

Ellsworth's reticent personality—his wife recalls that he once deliberately cut himself shaving to escape a speaking engagement—may have been one reason America never took him to its heart, though shyness hardly diminished Lindbergh's appeal. Another reason was that his exploits, extraordinary as they were, seemed a shade less dramatic and attention-grabbing than Byrd's aerial dashes to the North and South poles in the late 1920s. Byrd got most of the glory; his flights were lyrics, as one newspaper said felicitously, while Ellsworth's were epics. Ellsworth was the apparent runner-up who reached the North Pole three days after Byrd claimed *he* did—a magnificent second, but still second.

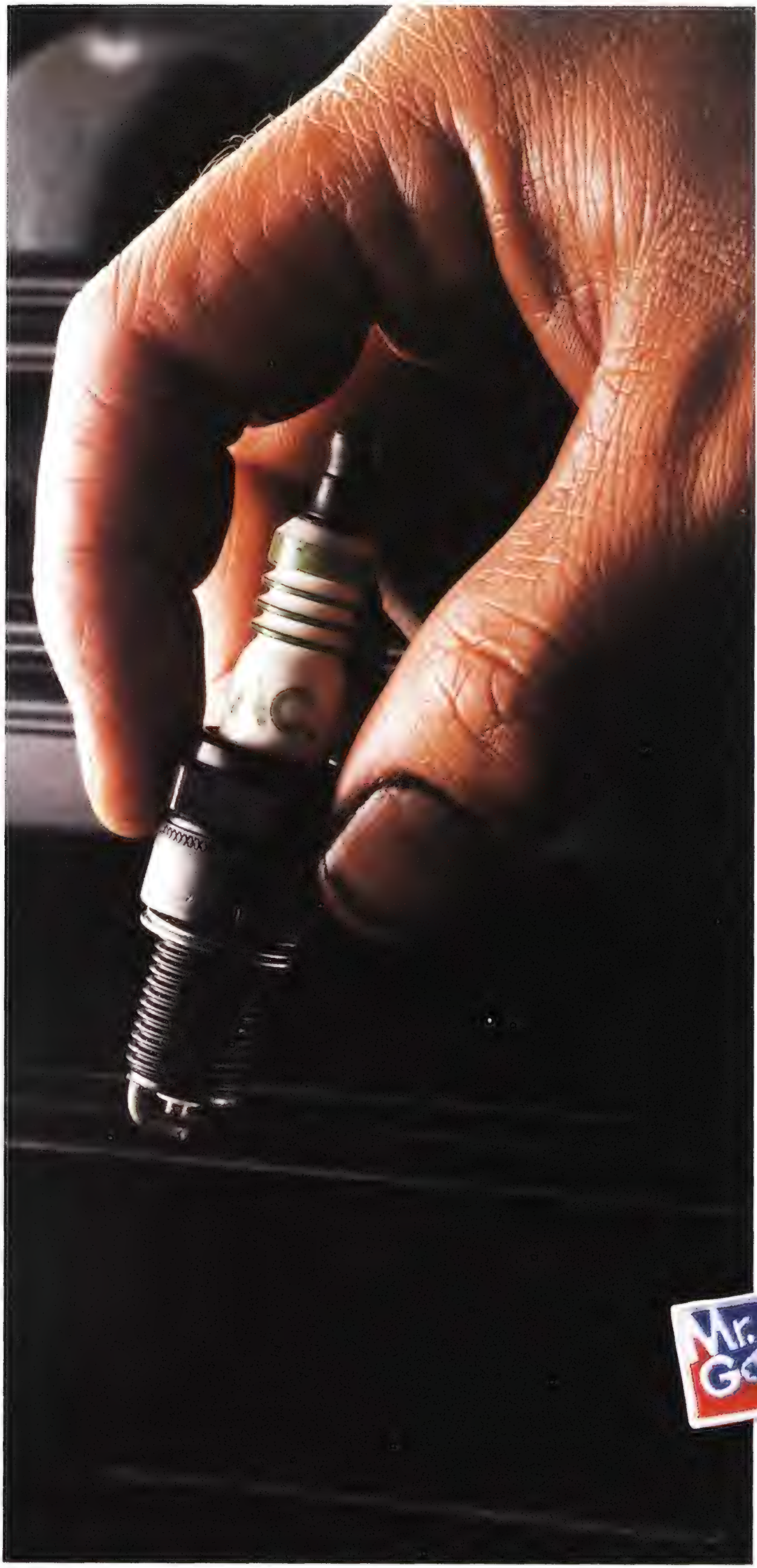
Byrd, moreover, came from a powerful political family and had a precocious grasp of public relations. He handled the hero's role with ease and flair. He had "charisma" before we knew what the word meant. Maybe the American public could accept only one polar star at a time, and Byrd was it. Byrd, Ellsworth and the great Norwegian explorer Roald Amundsen formed an exclusive club in 1926, which they called the Polar Legion. Its membership was limited to men who had led expeditions to the poles. The certificate they presented themselves, bearing their signatures in alphabetical order, is displayed at the American Museum of Natural History in New York. Amundsen scrawled his name in a bold, sweeping hand, big and commanding. Byrd's signature, almost as large, is careless and confident, with his name underlined. Ellsworth signed in a tight and tidy script a third smaller than the others, touched up with orderly little flourishes.

He was born to wealth, the son of a Chicago mine owner and banker who collected fine art and historic European villas. His father, a reserved and distant man, sent him to live with relatives on an Ohio farm after Lincoln's mother died young. There he grew up with a drive to prove himself physically. He regularly biked the 26 miles from the farm to Cleveland. In school, he ran track and wrestled. He eventually developed a strength and self-discipline that went well beyond physical fitness: "I delighted to match my powers against hardships under which men of lesser strength wilted," he wrote in his 1938 autobiography, *Beyond Horizons*. "The whole chemistry of my nature demanded these convincing tests."

An indifferent student, he attended the prestigious Hill School in Pennsylvania and struggled through two and a half overmatched years at Yale and Columbia before loping off in pursuit of the adventurous life he craved. He worked his way up from axman to engineer with crews surveying rail routes through the Canadian wilderness, hunted moose with Indians in British Columbia, mined placer gold in Alaska, and collected animal specimens throughout western North America for the U.S. Biological Survey, the forerunner of the U.S. Fish and Wildlife Service. He learned to ride and hunt and canoe, to navigate and climb, and to survive in the wilderness. In both his background and his passion for the "strenuous life," he resembled Teddy Roosevelt, one of his heroes.

By his early 30s, he had homed in on polar exploration—"the last great field for heroic enterprise" he called it—as his destiny. He was thrilled to sign on as civil engineer with a 1912 expedition in search of land northwest of Greenland, but the mission was aborted when the leader drowned before they could start. He sought out both Robert Peary and Amundsen, the men first to reach the North and South poles on foot (though some uncertainty remains about Peary), but came up empty again. When World War I broke out, he enlisted and learned to fly in France. But he was

Mr. Jackson first learned about Ellsworth while writing for Time-Life Books on flying explorers.



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judged too old, at 37, for combat. Pneumonia and pleurisy slowed him down after the war, but by 1920 he was again volunteering for polar duty, this time with the Canadian Vilhjalmur Stefansson. "I have a little money," he wrote Stefansson. "I have a will to work and I also have enough scientific knowledge to at least be useful in that way." Again it didn't work out.

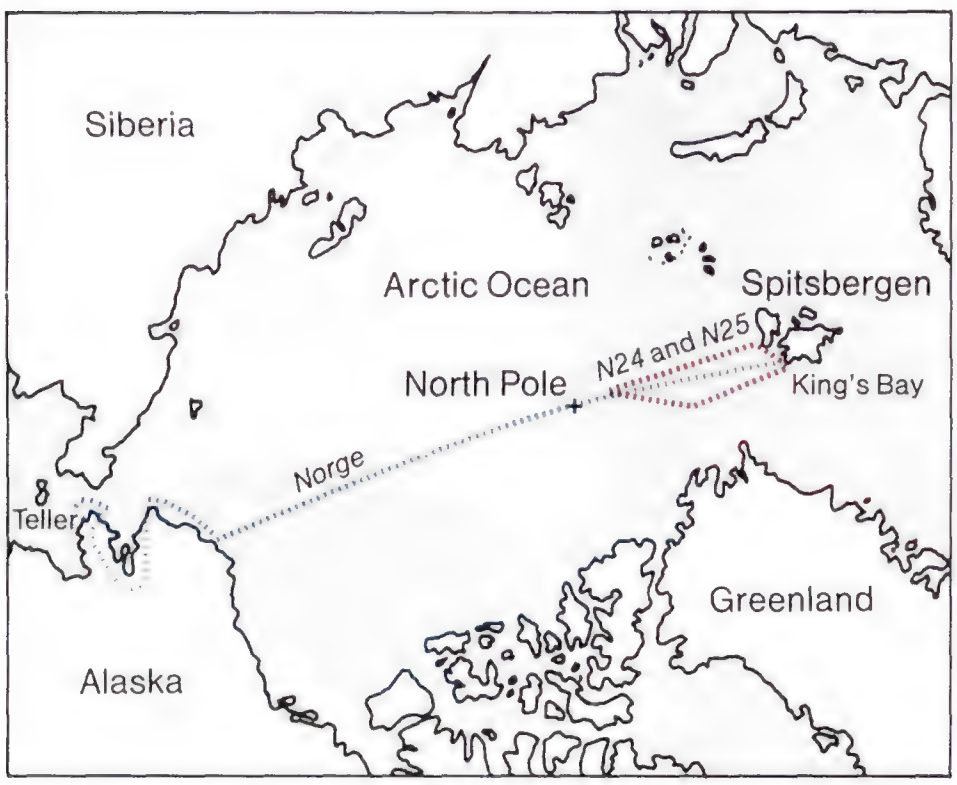
He was 44 by the time he finally got his opportunity. It happened with his chance discovery that Amundsen was passing through New York City in the fall of 1924. Ellsworth, about to leave for a second tour with a geologic survey of the Peruvian Andes, visited the great Viking at his hotel and mentioned that he might be able to help finance a polar trip. Before long they were discussing a flight from Spitsbergen, above Norway's north coast, some 770 miles from the North Pole.

The catch was that the money was to come from Ellsworth's father, who wasn't sold on the idea. In the letters between father and son at this time, the younger Ellsworth sounds more like a pleading college youth than a man approaching middle age. The two had never had an easy relationship. His father had wanted Lincoln to work in the family business, even trying to bribe him with mansions. "Lincoln never spoke to me about it," Mary Louise Ellsworth says, "but I know that his relations with his father were full of heartbreak. I remember hearing him talk about his father never visiting him at Hill School." Lincoln arranged for a meeting between his 75-year-old father and Amundsen, and got lobbying help from his younger sister, Clare. At last the senior Ellsworth agreed to back the Amundsen-Ellsworth North Pole Expedition with $85,000, roughly the equivalent of $500,000 today.

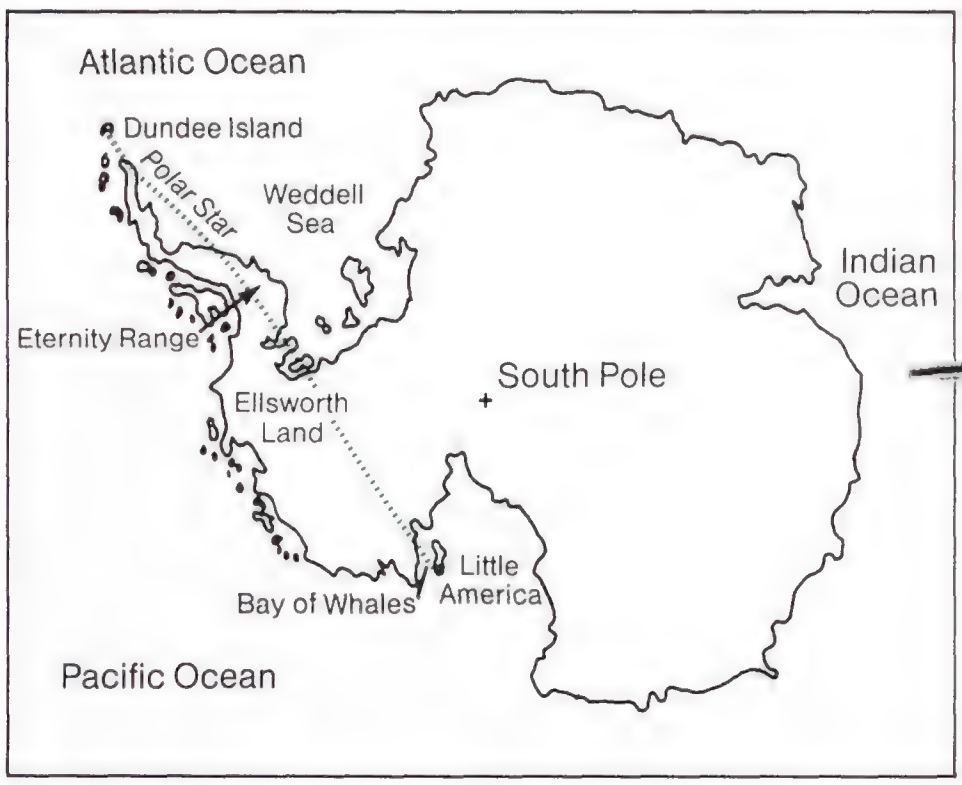
The six heavily bundled expedition members climbed into two twin-engine, open-cockpit seaplanes, prosaically named *N24* and *N25*, and took off from King's Bay, Spitsbergen, on May 21, 1925. Ellsworth flew as navigator on *N24* with pilot Lief Dietrichson and mechanic Oskar Omdhal, both Norwegians. Amundsen, Norwegian pilot Hjalmar Riiser-Larsen and German mechanic Karl Feucht crewed *N25*. Their stated goal was to sprint to the pole and return, but they secretly planned to land at the pole if possible, transfer all the fuel to one plane and fly on to Alaska, looking for unknown land en route.

When the planes shook off a fleecy fog after two hours and Ellsworth caught his first glimpse of the gleaming white ice cap streaked with ribbons of water, he thought he "had never seen anything so beautiful." Five hours later, believing they were close to the pole, the explorers decided to come down in an area where narrow leads of water twined between huge bergs and hummocky mounds of ice. Ellsworth wrote that it was like landing in the Grand Canyon. Both planes skidded across tiny lagoons and smacked into walls of ice. *N24*, Ellsworth and his two companions soon discovered, was damaged beyond repair.

The men established their position as 87 degrees 44 minutes north latitude, 156 miles from the pole. For several days the two crews, separated by three miles of ice ridges, crevasses and intermittently frozen leads, could not reach each other. Then the Arctic wind steadily pushed the floes they were camped on closer together until they were just a half-mile apart. Ellsworth, Dietrichson and Omdhal



Attempt to fly over the North Pole by plane in 1925 is shown in red. The dirigible flight one year later is blue.



Flight across Antarctica in 1933 is indicated in green; Ellsworth and his pilot had to complete the trip on foot.

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Ellsworth smiled from the open cockpit of *N25*, the seaplane that had returned him and his five companions to Norway.

knew that their only hope was to reach *N25*, so on May 26 they trudged off on skis across the thin ice that lay between them and Amundsen's plane.

Ellsworth was maneuvering delicately over the ice when Dietrichson suddenly cried out behind him and fell through. Then Omdhal screamed as he too went down. Ellsworth started to slide, then dropped to his stomach and extended his skis to Dietrichson, who grabbed hold and pulled himself out. Ellsworth then crawled to Omdhal, poked a ski within reach of the floundering man, and held on until a revived Dietrichson helped him get Omdhal's pack off so they could pull him out. Shaken and exhausted, the three stumbled on to their reunion with Amundsen, who informed them that *N25* was undamaged but locked in ice.

Since they had no radio, the world outside was without a clue to their fate. "Arctic Swallows Amundsen and American," one headline blared. Stefansson thought they were somewhere in Alaska; Byrd opined that they were probably safe and eating musk-ox. Ellsworth's sister, Clare, pronounced herself unconcerned. Amundsen and her brother were "magnificent, silent, resourceful men," she declared. "These two men could get out of anything."

Well, almost anything. The beleaguered party was fighting a seemingly losing battle against shifting ice blocks, a dwindling food supply and the absence of an open patch of water or a stretch of flat ice long enough to serve as a runway for their seaplane. "I don't believe six men ever found themselves in a more hopeless position," Ellsworth wrote in his journal on May 31. "The leads won't open up and the ice is too thin to run the plane onto them. We are marooned on an ice cake 250 yards square." They halved their rations: biscuits, hot chocolate and the protein-rich, dried-meat cakes called pemmican. If they couldn't get the plane in the air by June 15, they agreed, they would then decide individually whether to stay there or to attempt an all but hopeless trek to Greenland.

Finally they found a floe large enough for a runway. It took a week of draining labor to bridge two crevasses to get the plane onto the floe, and to chop and pack the ice smooth enough to facilitate a takeoff. On the morning of the 15th, with the surface finally "crisp as a tile pavement," all six men piled into *N25*, which managed a bumpy liftoff. Eight hours later they landed off Spitsbergen, and a sealing vessel picked them up. The first news Ellsworth heard on returning to civilization was that his father had died at his Italian villa.

The acclaim the explorers received in Oslo gave the withdrawn, solitary Ellsworth a rush he had never felt before—"an intoxicating draught," he wrote, that "created an appetite that could never be once and for all appeased." When Amundsen said publicly that they all would have perished had Ellsworth not rescued Dietrichson and Omdhal, it was the final confirmation: he had proved himself, though his father had not lived to see it.

Their near-disaster persuaded both Amundsen and Ellsworth that a dirigible, with its longer range and hovering ability, was superior to an airplane for polar exploration. Accordingly, with Ellsworth now bearing the brunt of the bankrolling on his own (he had inherited $1.2 million), they bought a 348-foot-long airship from the Italian government, renamed it *Norge* (after Amundsen's homeland) and outfitted it for a flight from Spitsbergen across the polar sea to Alaska. The 16-man crew, all but Ellsworth either Norwegian or Italian, assembled at King's Bay in May 1926. But by this time there was a new ingredient in the polar stew: Byrd.

Still loyal to planes, Byrd was ostensibly leading a search for the mysterious "Crocker Land," which some thought lay north of Greenland, but a few days after arriving at King's Bay he announced that he was flying directly to the pole the next morning. Amundsen, in Ellsworth's account, "fairly bored him with his eyes as he answered, 'That is all right with us,' " but one can almost see the clenched teeth. Though all concerned repeatedly denied anything so demeaning as a "race" to be first over the pole—Ellsworth was already on record that

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Beaming Ellsworth watched Amundsen congratulate Richard Byrd and his pilot, Floyd Bennett, on their pioneering polar flight.

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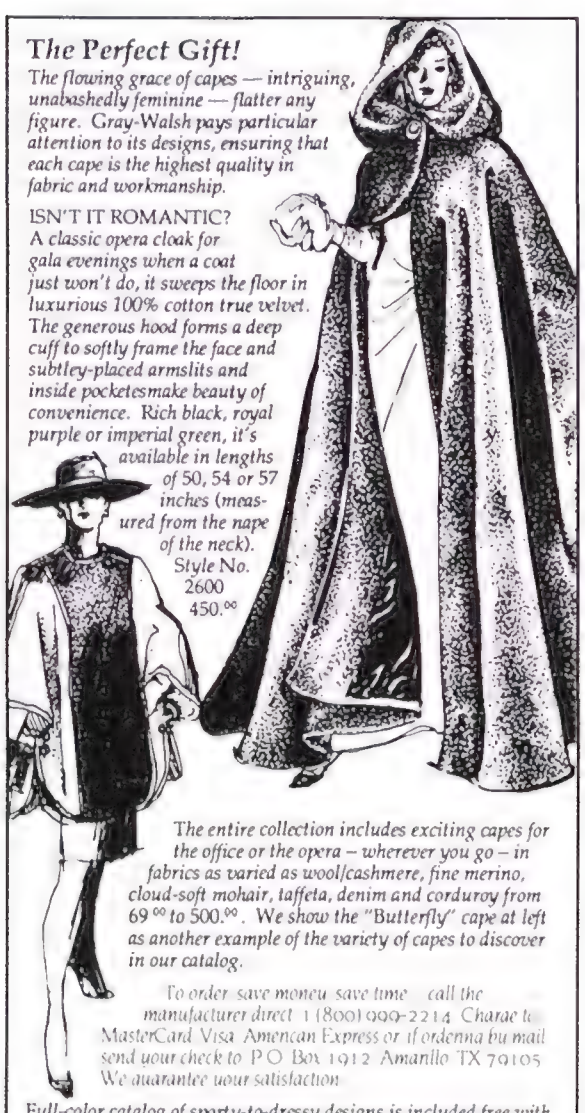

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the "end is in the doing"—it was clear that they all coveted the distinction. Byrd claimed it on May 9, and Ellsworth and Amundsen were there to congratulate him on his return to King's Bay. Ellsworth later wrote about Byrd's "oft-repeated remark" that night—"Hope you feel all right about it, old fellow"—adding, "We did." Ironically, some historians now doubt that Byrd actually reached the pole.

The *Norge* ascended on the morning of the 11th. The flight north was calm, with fog alternating with clear weather. They descended briefly at 87 degrees 44 minutes, just east of the site of their ordeal a year earlier. Shortly after midnight they reached the pole, pausing to drop the flags of Norway, Italy and the United States while gazing down at a landscape Ellsworth described as having "an unearthly pallor." When they set their course for Alaska, the real fascination of the voyage began for Ellsworth and Amundsen. Now they were sailing over territory never seen before. They stared at the ice cap, alert for anything suggesting land—a peak, a change in water color. There was nothing. At 86 degrees north latitude, fog draped the dirigible and blocked further sightings.

The final leg of the flight was a nonstop nightmare of fog and storms. Ice crippled the radio and bit holes in the airship's skin, which the crew hastily laced back together as best they could. The weather was too thick to make observations, forcing them to navigate by dead reckoning. With radio contact lost, Amundsen and Ellsworth were once again feared down somewhere on the ice cap. Gale winds and snow battered them as they crossed the Alaskan coast and continued to dog them as they dodged peaks on the mainland; at one point their trailing antenna dragged across a mountaintop. Finally, 70 hours and 3,180 miles after they began, pilot Umberto Nobile set the *Norge* down at the tiny coastal village of Teller, in northwest Alaska.

Byrd, soon to enjoy the crowd's adulation in a tickertape parade up Broadway in New York City, was characteristically generous in praising the *Norge* flight, calling it "one of the great feats of our age." The flight had

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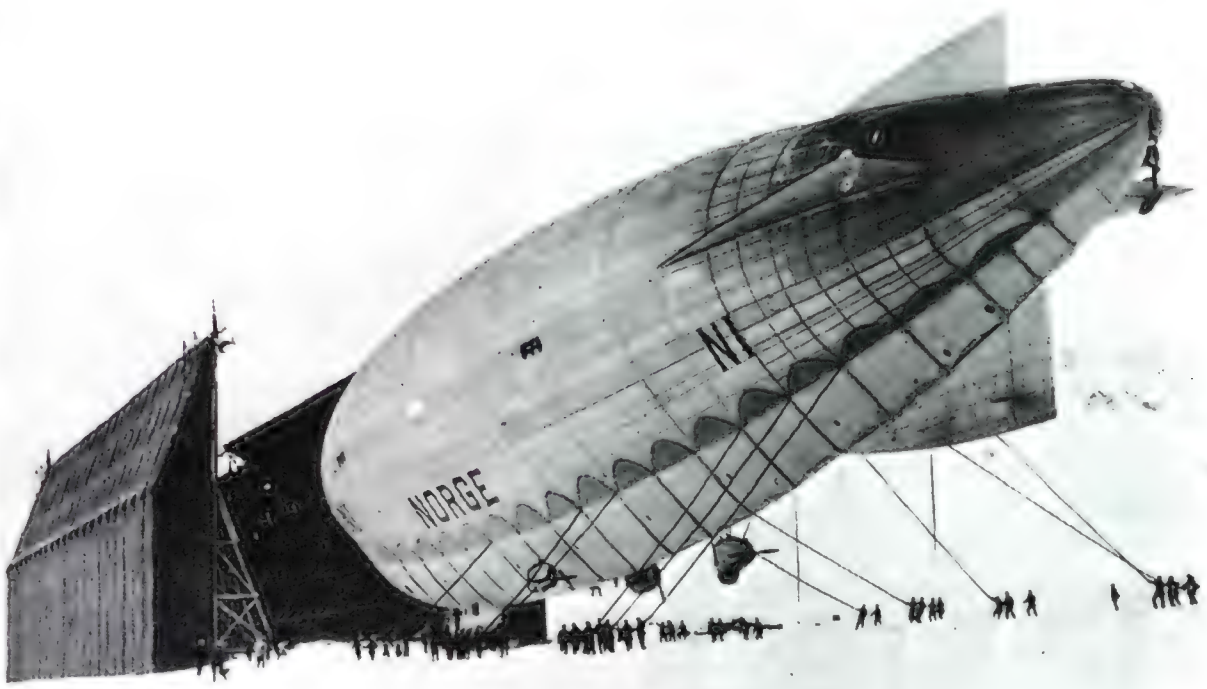
been the first across the polar sea; it had shown, so far as visibility permitted, that there was no new land in that sea. Amundsen promptly declared himself done with exploration at 54. Ellsworth, eight years younger, was now on his own.

For a few years he seemed to lose his focus. He talked of another Arctic expedition, but nothing came of it. He renewed his interest in geology, collecting fossils on frequent hikes into the Grand Canyon and on an 800-mile canoe trip in Labrador. Though he lived most of the year in New York, the city oppressed him. When Amundsen disappeared in the Arctic in 1928 while leading an aerial search for the airship *Italia*, captained by Nobile, Ellsworth sounded an elegiac note. With Amundsen's passing, he wrote, went "a certain something that has to do with romance, with youth, with the dreams of life."

Gradually his gaze shifted south. Isaiah Bowman, director of the American Geographical Society, told him that a third of the Antarctic coast remained unexplored. Byrd had already established his base at Little America and made his dash to the South Pole. Ellsworth recruited Antarctic veterans Sir Hubert Wilkins and Bernt Balchen to join him in what he called "the last great adventure in South Polar exploration," a flight over unknown terrain, from one end of Antarctica to the other. Wilkins would be his operations manager and Balchen his pilot.

In 1932, Ellsworth met Mary Louise Ulmer in Switzerland. He was living there in a castle that he had inherited from his father and studying aerial photography with Swiss aviator Walter Mittelholzer. Mary Louise, the daughter of a Pennsylvania industrialist, was taking flying lessons from Mittelholzer. Ellsworth invited her and her mother to his castle the day they met. "We had a quiet romance," she remembers. "He asked me to marry him and to stop flying, and I agreed." They were married at New York's Little Church Around the Corner in May 1933, seven months before Ellsworth sailed from New Zealand on his first voyage to Antarctica.



Near hangar at Spitsbergen, crew wrestled the 348-foot-long *Norge*, the dirigible that Amundsen and Ellsworth used in 1926.

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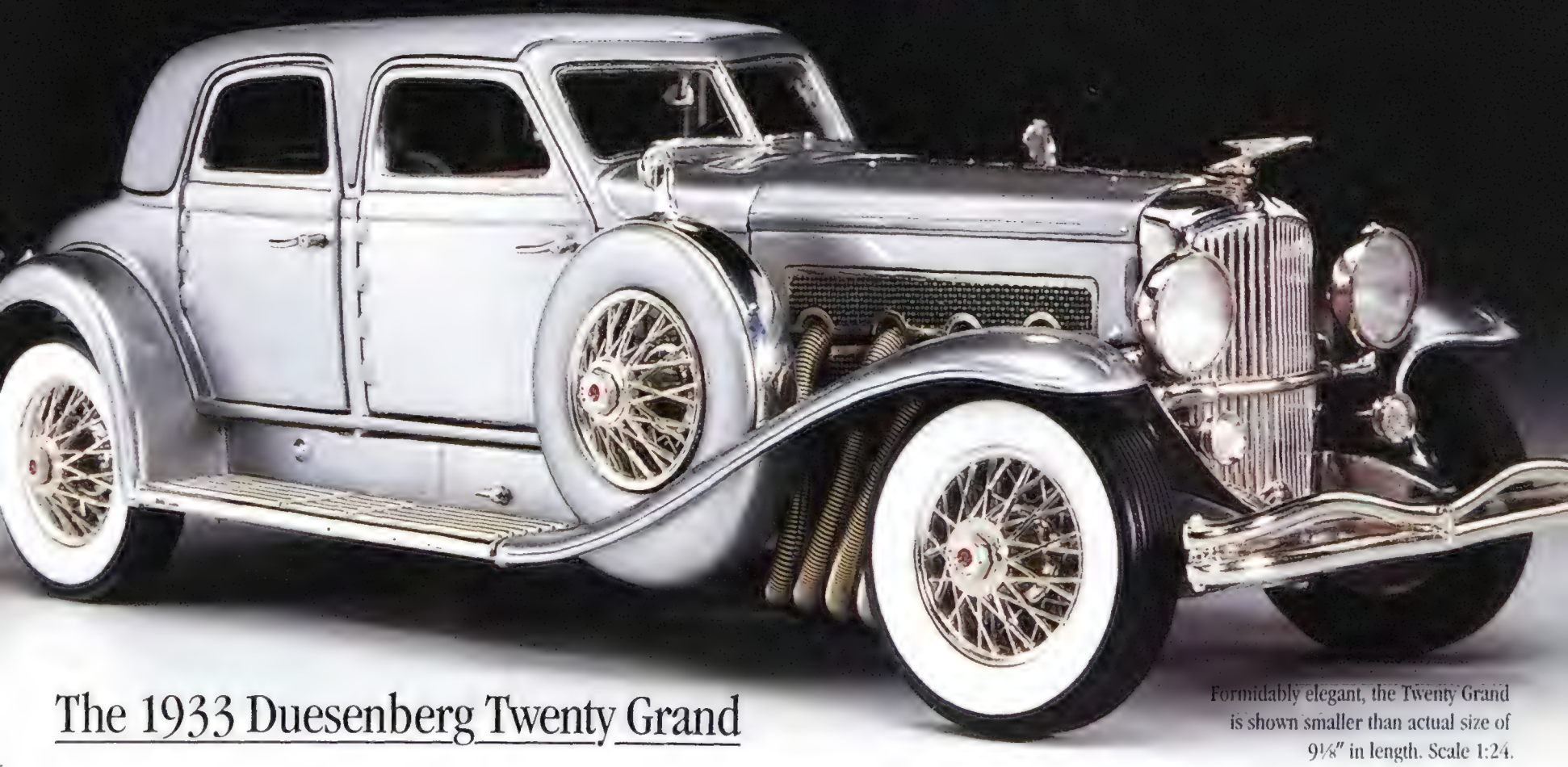

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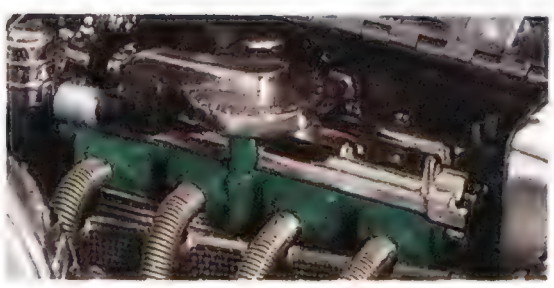

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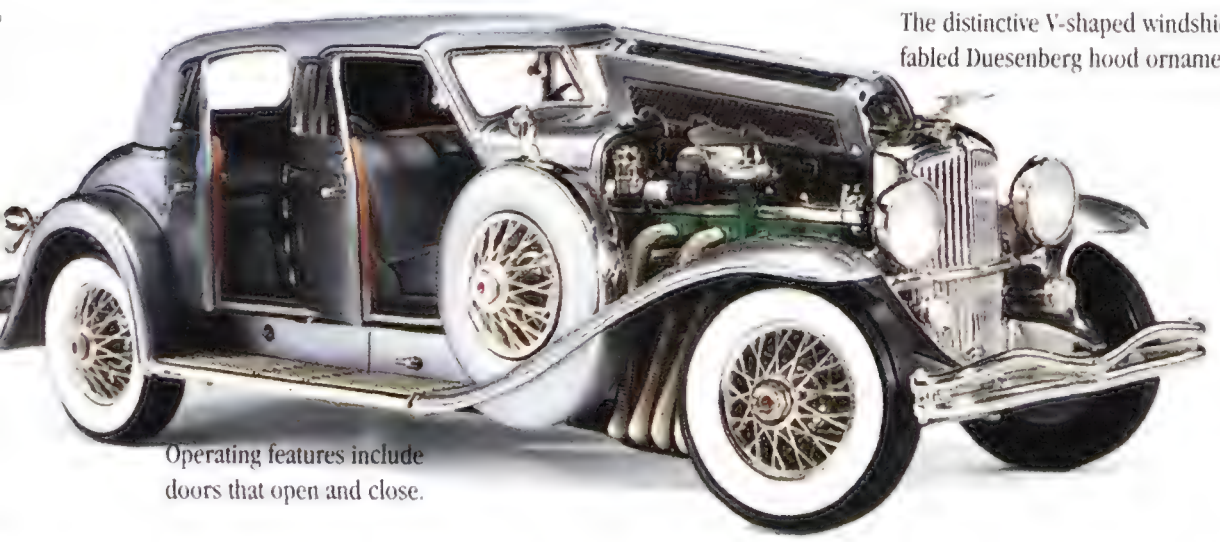

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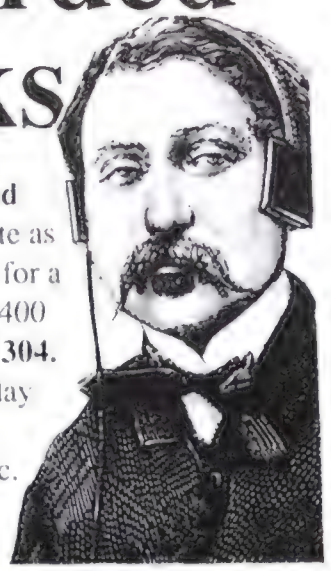

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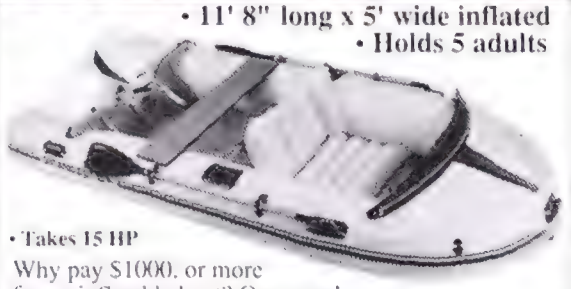

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The hyphenated expeditions were behind him now—this one was all his. He bought a ship in Norway and named it *Wyatt Earp* for the frontier lawman he admired to the point of obsession, filling the vessel with Earp mementos. The plane he and Balchen hoped to fly round trip 2,700 miles from the Bay of Whales (near Little America) to the Weddell Sea was a low-winged, single-engine craft on skis, with a range of 2,900 miles. The idea was to land and camp if the weather turned sour and take off again when it brightened. Their aims included confirmation that Antarctica was one landmass and not two, and an investigation of Antarctic mountains to see if they were an extension of the Andes.

The foray ended almost immediately. The plane, named *Polar Star* (now at the Smithsonian's National Air and Space Museum), nearly sank when the shelf ice it was sitting on suddenly began to break up shortly after their arrival at the Bay of Whales, in January 1934. They were barely able to save it, but as it turned out the plane was damaged badly enough to make them abort the expedition. Ten months later Ellsworth returned with a new plan, a one-way flight from the edge of the Weddell Sea to Little America, but again he was thwarted. This time it was weather, which was foul for two months straight, and bad ice conditions. He and Balchen made one try anyway, turning back after about 200 miles because of bad weather, to the eager Ellsworth's intense disappointment. "Ellsworth can commit suicide if he likes," Balchen later exclaimed to Wilkins, "but he can't take me with him."

The following October, after a jaguar-hunting vacation in Brazil with Mary Louise, Ellsworth returned to Antarctica for a third try, this time with a new pilot, a remarkably uncommunicative Canadian named Herbert Hollick-Kenyon. Weather and ice conditions were better that year at Dundee Island on the Weddell Sea, where they established their jump-off

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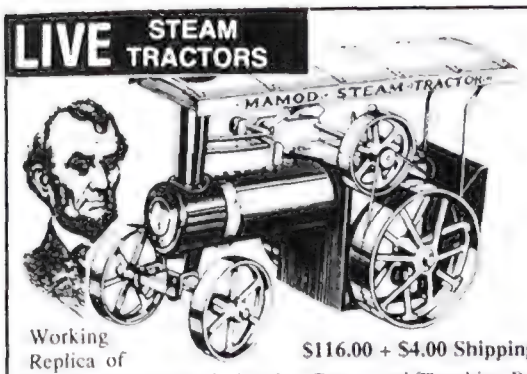

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base. On November 20 they finished loading five weeks' worth of provisions and gear onto the *Polar Star* and took off for what they thought would be a 14-hour flight, heading southwest across Antarctica to Little America. But a broken fuel gauge forced them back after 90 minutes.

The next day they tried again, and this time it looked like a go. They crossed to the Antarctic mainland and soon penetrated previously unexplored terrain. A column of jagged, 10,000-foot-high mountains suddenly loomed before them, running north to south for at least 75 miles, mountains no man had ever seen before. "This was the greatest hour of my life," Ellsworth wrote, "a mountain system of major importance, and our eyes were the first to behold it!" He named the peaks the "Eternity Range." Meanwhile, Hollick-Kenyon was struggling with a sluggish plane. Clouds clamped down on them. They changed course in search of clear weather but finally gave up and turned back.

Ellsworth was beside himself. What about the plan to land in case of rough weather? Hollick-Kenyon said he was afraid he couldn't take off

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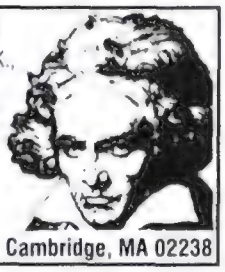

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again if he landed. Ellsworth felt doomed to permanent frustration.

Early on the morning of the 23d Ellsworth again went over the contingency plan with Wilkins. The support crew was to drop food at specified points if they lost radio contact. The *Polar Star* once more nosed into a clear sky. Some five hours out, Ellsworth and Hollick-Kenyon spotted the Eternity Range again. Three hours after that the radioman on the *Earp* received a garbled message—"All well. I estimate that we are at seven *whurp zzuldung whooltcrazzptlin* or thereabouts"—before a faulty switch silenced the plane's radio. Ellsworth was again lost to the outside world.

The two men aboard the *Polar Star* spotted another range, the main peak of which Ellsworth named for Mary Louise. At 14 hours out they landed on a high plateau, believing they were near Little America, but when they took a reading they found they were still 670 miles short. Ellsworth planted an American flag at this site and claimed roughly 350,000 square miles of previously unexplored territory for the United States. He named it "James W. Ellsworth Land," for his father.

Polar Star, Ellsworth's ski plane, rode on Antarctic expedition ship *Wyatt Earp*.

Ellsworth wedded Mary Louise Ulmer before dashing off to the South Pole.

After resting 19 hours at this first camp they took off again, but thickening weather forced them down after only a half-hour. They waited three days in the second camp, then managed another 50 minutes in the air. At their third stopping point the Antarctic finally attacked full force. A ferocious blizzard pinned them in their tent for three days and grounded them for seven. Drifts piled up against the *Polar Star*. They tinkered with their radio to no avail. Ellsworth's left foot began to feel numb. The taciturn Hollick-Kenyon volunteered one of his rare, unsolicited remarks on their sixth day there: "Maybe this is all meant to try us out." Back in New York a relief expedition was cranking up. Ellsworth and Hollick-Kenyon were still 500 miles from their destination.

They escaped the wretched third camp on December 4 and came down four hours later to take readings: 125 miles to go. On the 5th they flew for slightly more than an hour and spotted the Bay of Whales; at last they were close. Byrd, in New Jersey, was

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telling reporters that they were probably somewhere near Little America. He was right: they were 16 miles away—and out of gas.

The next ten days were the toughest yet. Unsure of their position, wearing snowshoes, they man-hauled their gear on a sled for 100 miles on a tangled route through deep snow and slush, often losing their way and circling back. On the 15th they finally spied the "sparse thicket of masts, poles, stovepipes and guy wires protruding above the snow" that was Little America. They broke a skylight and let themselves in. Ellsworth then produced two bottles of brandy he had been saving, and they celebrated.

With ample food and a coal stove, they made themselves comfortable and reflected on what they had accomplished. They had covered 2,200 miles, 1,200 of them previously unexplored, in 23 days. They had provided the data for the first good topographic maps of a vast region. Ellsworth was somewhat miffed when they were rescued a month later not by his men in the *Earp*, who were close by, but by the Australian research ship *Discovery II*. A cheering

Ellsworth broke the ice at polar singles party by introducing two wallflowers.

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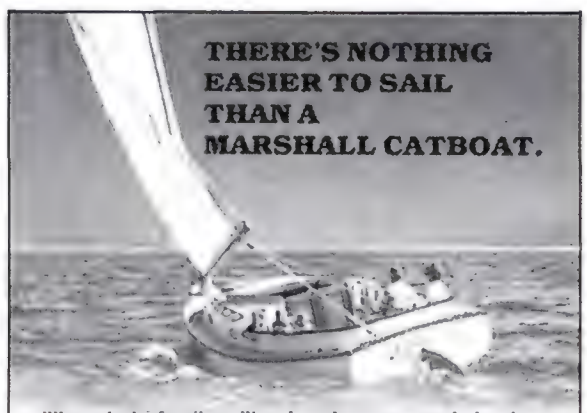

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After rescue, Ellsworth and Hollick-Kenyon relaxed aboard research vessel.

throng of Aussies welcomed "good old Ellie" to Melbourne in mid-February 1936.

"Lincoln and I were riding up Park Avenue after he got back," his widow recalls, "and I said something about how hard it was to wait and worry and wonder whether he was all right. He said, 'I don't understand that, I knew where I was the whole time.'"

A speech he gave at an Explorers Club banquet a few months later sounded like a valedictory. The triumphant Antarctic trip was "in many ways the climax of everything," he said, and he was content now to let others unravel the remaining polar mysteries. He wrote his autobiography, which drew mixed reviews when it appeared in 1938 (one critic found "utter sincerity and no humor"). He kept fit, traveled often and indulged a few rich man's foibles. "He'd never carry money," his wife remembers. "It was the craziest thing I ever saw. He'd produce a letter of credit instead. He got on a train to New Haven once with no money and no ticket but convinced them to let him stay aboard." In New York he insisted on dining nightly at the Colony, a posh restau-

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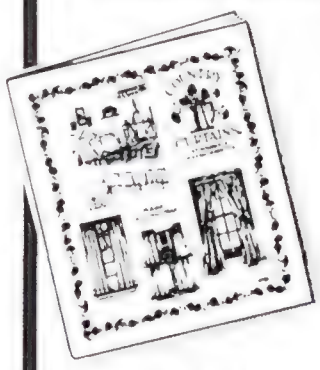

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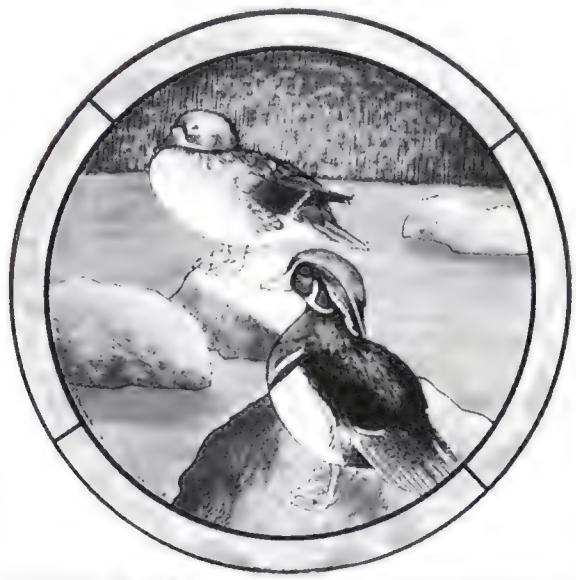

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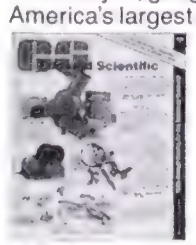

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rant where he always ordered the same entree.

But he couldn't stay away from the Far South. He was like an aging athlete unwilling to let go. He led another expedition in 1938-39 to explore the Indian Ocean sector of the frozen continent. He and pilot J. H. Lymburner, hampered by bad weather and a short runway that limited their fuel supply, made a three-hour flight over new land that resulted in a claim of 80,000 square miles for the United States. In 1939 he announced plans to go again to explore Ellsworth Land, but the outbreak of war stopped him.

The Ellsworths showed up in the papers from time to time in the 1940s, usually sailing or arriving on a luxury liner. Inevitably the reporters found him, and inevitably he told them that another Antarctic trip was in the works. But the words sounded hollow now. He had suffered a head injury in a fall while hiking and was never quite the same. He was sometimes confused and unsteady on his feet. He looked different, weaker, in photographs.

Even then, Antarctica was rarely out of his thoughts. "To those who are not afraid of solitude nor of themselves, it can make one feel, as nowhere else, the magnificence and scale of the Creator," he said in 1944. "Of course I am going back to the Antarctic again." "He was still planning to go, absolutely, until the bitter end," his wife recalls. He expressed what were undoubtedly his true feelings in a 1948 letter to his friend Harold Clark: "I shall never give up the idea," he insisted. "It is the thing that keeps me going and hopeful. You know one has to have something ahead to build on."

He died of pneumonia on May 26, 1951, in his suite at the Carlyle Hotel in New York. The death notices, though respectful, were confined to the obituary page. He was buried with minimal fuss in the family plot in Hudson, Ohio, near where he grew up. Hubert Wilkins, who probably knew him as well as anyone, summed him up as "lovable, boyish, shy and reserved, with high ideals yet somewhat vain, petulant, and possessive." Ellsworth had once written that no man could ask for more than the epitaph on the tomb of polar explorer Robert Falcon Scott—"a gallant gentleman." He was certainly that.

Commemorative stamp, issued in 1988, features *Polar Star* and reminds Americans of Lincoln Ellsworth's extraordinary accomplishments.

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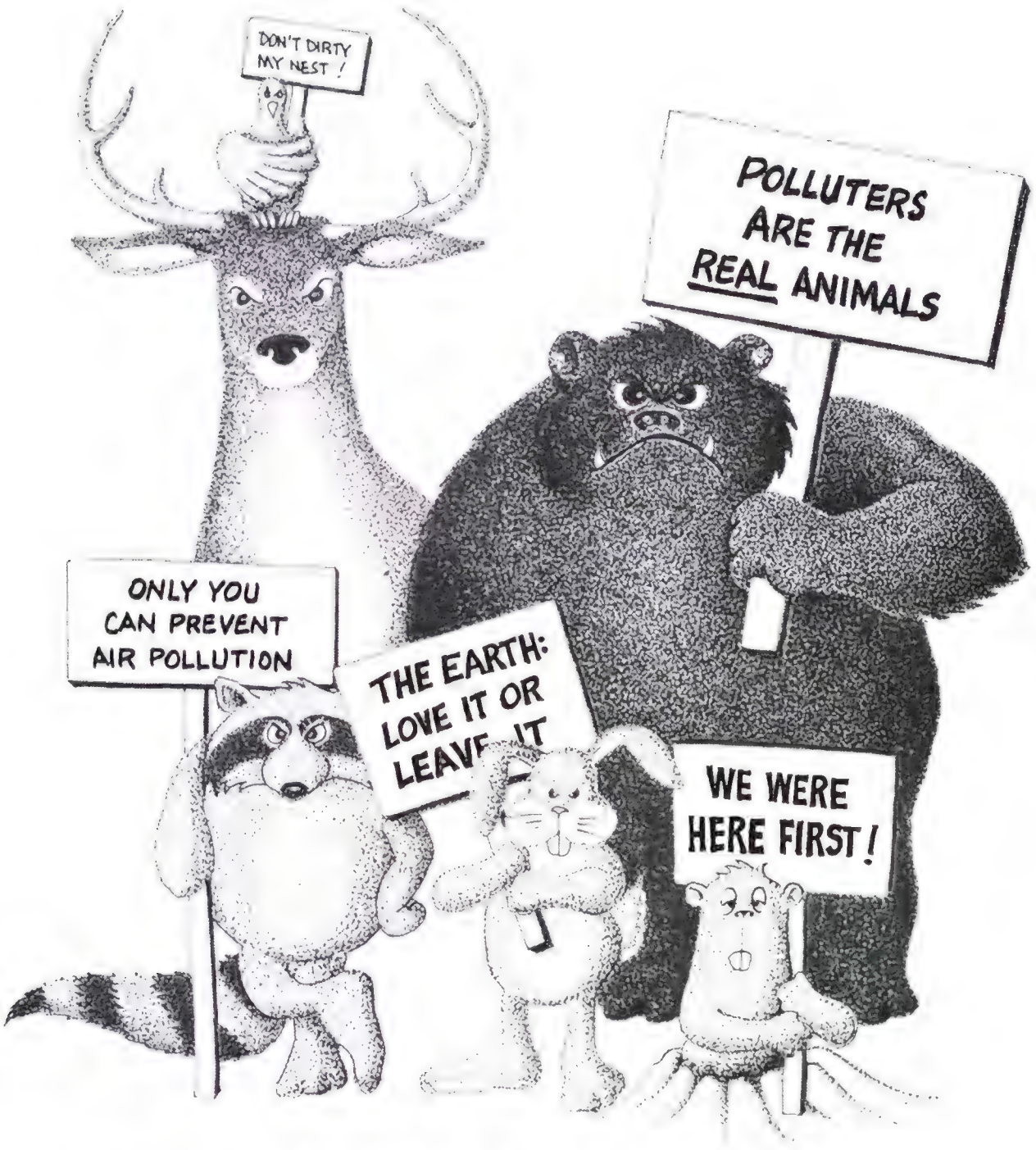
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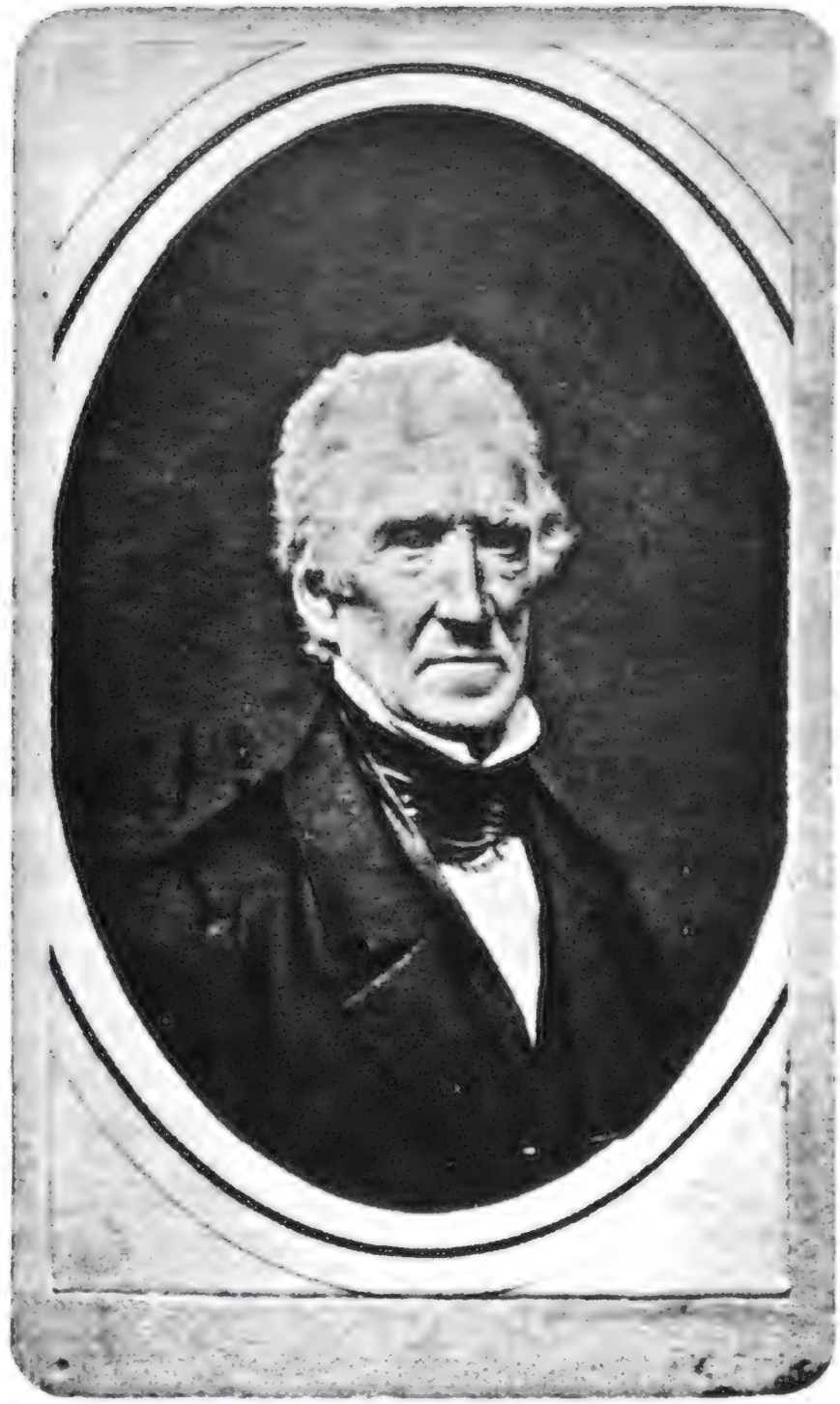
1990 USCEA

By Michael Kernan

'What I would give for a snapshot of him when he was 21!'

In 1990 a great-great-grandson tries to get to know the man who came from Ireland in 1800 and settled in upstate New York



A dignified lawyer-politician, William Kernan answered a "Boy Wanted" ad on the day he landed.

Ancestors are old by definition. You see them in brittle, fading photographs in oval frames or possibly in actual painted portraits that your family believes are immensely valuable, and they are wearing peculiar clothes, and they are old. Wrinkled and experienced in life, they are full of dignity and accustomed to respect. Which is only right, because as pictures they are indeed aged, a hundred, two hundred years, aged enough to become part of the scenery around the house, so familiar you never really look at them.

(When I was little we would go every Christmas to my Uncle John's open house, where we would meet all the cousins from out of town and where we would all ritually steal into the dining room to contemplate a portrait of somebody's ancestor, I never knew whose, who was so ancient he wore one of those towel things around his neck as though his throat had just been cut, and who was not merely a geezer but also was spectacularly cross-eyed. It was the high point of our visit, especially if we could introduce some new cousin to this arresting sight.)

I have here a photograph of my great-great-grandfather, William Kernan, a rather starchy old man wearing a wraparound neckerchief, a stiff collar curling crisply up under his redoubtable chin, and the heavy black suit coat of his day. He has the family's long face, long jaw and long straight nose, and frisky white hair that fuzzes out over and around his ears. My father had just the same lively white hair. The eyes beneath the beetling white brows are direct and a little sad, and there are deep lines down his cheeks to the corners of his mouth. He has a kindly look.

But he is old.

Inspired by the recent centennial of Ellis Island, I set about to look him up, the immigrant ancestor who started the whole enormous proliferation of Kernans around Utica, New York, as well as downstate. The records at the National Archives do actually—to my mild astonishment—have a "William Kernan" arriving in New York from Ireland in August 1800, and he is described only as "aged 21."

Twenty-one! My ancestor!

What I would give for a snapshot of him when he was 21, bright-eyed, smooth-skinned, with his life just ahead of him! I imagine him on the deck of the ship easing its way out of Sligo Bay one day in April nearly two centuries ago. I try to see the ship's sails filling out as it glides away from the dock, to hear the snap of canvas and the creak of ropes, the shouts of the seamen.

He would be looking back, of course, bellied up to the rail, all his belongings rolled in a bundle under his arm.

Perhaps his mother was there, his nine brothers and sisters, some of them crying, surely, and waving at the voyager. Was it a sunny day? A gray April morning? Was it raining?

From family letters we know he stood 5 feet 10, with light hair and blue eyes, "a long nose and a very firm mouth . . . thin and muscular, very strongly built, and weighed about 160 pounds," and I suppose he would have been well muscled and weathered as any farm lad.

Though the family tradition insists that he was far more than that, his father being a landowner, "sometimes merchant, sometimes gentleman," according to one genealogical account. (His oldest brother, Michael, college-educated, took a job for a few months after the troubles of 1798 reduced the family fortunes, but soon returned home, declaring that "a gentleman he was born and a gentleman he would die," and lived out his life with his sisters in modest idleness.) Still, the records are sketchy, and there were a lot of Kernans of various stations in Ireland in those days, not only country squires but yeomen, soldiers, farmers, clerks, harpers and conceivably even a scoundrel or two, if such existed in that country then.

I try to see him, to hear his voice (he would speak with an Irish lilt, wouldn't he, I realized with a small shock), to put myself there with him, to breathe the clean sea air as he breathed it, face alight with the first glimpse of America and New York harbor (minus the Statue of Liberty, still almost a century in the future).

His daughter Alice wrote down some of his recollections—family legends now, as is Aunt Alice herself—the typewritten narrative photocopied and passed down the years. The eighth child of John and Jane Brady Kernan, he was born February 7, 1781, in the town of Ned in County Cavan. We don't know when his father died, except that it was before 1804, so it is possible that William had left home upon that event. He wanted to become a landowner, he told the ship's captain. He brought his own food for the journey, for that was the custom then. The captain habitually collected everyone's unused food, for he had once been shipwrecked and nearly starved, he told William. The dangers of a crossing by sail included not only storms but pirates and French privateers.

"We arrived in the City of New York the following August," he recalled, "after a voyage of 18 weeks not remarkable in any way except for the taking by hook and line of a shark which measured 10 feet in length."

In New York the ship was directed to the quarantine grounds off Staten

Island, for there was a yellow fever scare. One local newspaper, *The Spectator*, carried a notice on August 6: "A number of citizens has expressed a wish that the Health Officer at the Quarantine ground would publish the number of patients, together with their different complaints, that have come under his care at Staten-Island this season, as it will throw some light on the importation or non-importation of that fatal disease the Yellow-Fever." Three days later the number was duly announced: 12 patients at the Marine Hospital, of whom 2 had died.

William was frantic to get ashore for he had seen a job advertised. "I told the captain of my desire and he kindly said, 'Say nothing to anyone, but have a change of clothing ready in a small bundle so as not to attract attention, and I will try and send you off with the grocer tomorrow morning.' The next morning, therefore, I was ready with a change of clothing tied in a handkerchief [there were no grips in those days and handkerchiefs were one yard square]. I quietly left the ship and reached land in safety and took my first look at New York. I went at once to a place where I saw a sign 'Boy Wanted,' made an engagement and commenced work, where I remained until the following April, with Mr. Wayman, that being my employer's name." (There was a "William Weyman" on Maiden Lane, I found when I checked contemporary directories.)

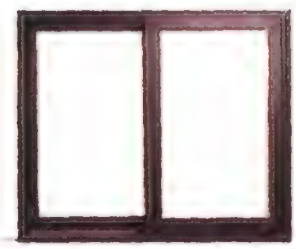
What a time it was: America in 1800. The papers were full of the Battle of Marengo, which Napoleon had just won that June. All the foreign news arrived several months late, of course. New laws enacted by the Sixth Congress were reproduced in full and signed by President John Adams and Vice President Thomas Jefferson.

The Spectator quoted a pamphlet by one J. Furman then circulating in New York. It warned of the danger of electing Jefferson to the Presidency "on account of his infidelity," meaning that he was irreligious.

The paper's editor staunchly agreed. "Nothing but the madness of party could ever have held up Mr. Jefferson as a candidate," he declaimed, "a man who has a great deal of speculative science, but very little solid philosophy and still less practical knowledge." Worst of all, he went on to point out, was the accusation "*that the French wish him elected.*"

The Spectator was a disorderly mixture of foreign reports, shipping news, essays and ads, and one issue about that time printed a letter from a correspondent in Oneida, New York, west of Albany. "The Western country exhibits a pleasing sight—the farmers are in their glory with plentiful crops of wheat. . . ."

I wonder if William saw that item. I



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wonder if his eye passed over those same tiny, printed letters. For it was to central New York that he determined to go. That next April he asked Wayman for his wages and "the money I had deposited with him," saying that he was moving West. "The West at that time was anywhere west of Albany," Aunt Alice remarks.

Wayman wanted him to stay. A Quaker neighbor and his wife also begged him to stay and become their heir. He must have been an appealing youth, I imagine, intelligent and modest, to judge from his daughter's account, and now I think I see signs of humor in the old eyes of that picture.

So he headed West. He took a boat up the Hudson River to Albany, a two-week sail, and then made the laborious trip up the Mohawk by pole boat, until he reached Utica.

The Erie Canal wasn't built yet. It wasn't to be started until 1817. By the time it was completed in 1825, thousands of Irish immigrants—many of whom had dug the ditch—had settled along its path from New York to Buffalo. By then there were so many Irish in upstate New York that a popular toast of the day hailed "the capital road from Cork to Utica."

But that was all still to come. In 1801 upstate New York was sparsely inhabited, the woods were deep and the roads often mere tracks through a virgin wilderness. At Utica, William stopped for lunch—bread and milk—at Bagg's Tavern, a double log house kept by Moses Bagg and later to be Bagg's Hotel. The Bagg family is still well known in Utica.

(I am thinking about that bread and milk. Sometimes my father and I and Howard Taylor would visit my Uncle Nick on Howard's fox farm high in the Adirondacks near Malone. We would arrive well after midnight, with the autumn frost already in the air, and I would have to be awakened in the backseat when the car pulled

The author has written on toy guns (October 1989), the Enigma machine (May) and landscape artists (April).

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up at the steep-roofed house. Nick was the caretaker there for Howard, a silent solitary with a sharp, lean face rather like Henry Ford's. He and Nick were my heroes at age 10. We would all sit down at the big table in front of the huge, blackened, stone fireplace, and Nick would bring bowls of cold milk and a platter of homemade white bread, the thick slices almost as big as the plates. I learned to float my bread in the milk, pour honey over it and eat it with a spoon. For the first time I understood the appeal of the Bible's land of milk and honey. For dessert there would be maple syrup, spooned up neat. It was all the supper you could want.)

William walked on, up what was to become Genesee Street, the main artery of Utica where his descendants were someday to open their law offices, and headed west 90 miles to Geneva, at the head of the Finger Lakes. It was another 30 miles to the village of Tyrone, in a part of Steuben County now called Schuyler County.

There he bought a patch of woods at $1.25 an acre, built a log cabin and started chopping out a clearing. I gather he bought the tract from one Thomas O'Conor, who had owned a large section and who had influenced other Irish in settling the region.

He spent the first two or three winters with a family named Minor in Seneca Falls. I get the feeling that people stuck together on the frontier. In a wild country where you pulled your own teeth, and depended on a passer-by to set your broken leg, and knew you would die if your appendix burst, you depended on your neighbors, whoever they were and however far off they lived. In those first years Indians were probably William's only neighbors (Senecas, I suppose; anyway, members of the Iroquois League), as he was the first white to settle Tyrone.

The work of clearing forest land was brutal for a lone man. You chopped down trees and burned them, then planted corn in the ashy soil without plowing. One night he was so worn-out that he slept around the clock and awoke to find the sun setting. He slept the second night, too.

He went back to New York City once, in 1804—making more than 200 miles by horse in three days—to meet his widowed mother, his youngest brother, Francis, and four sisters. They remained in the city, Francis becoming successful in real estate. (He never married, died in 1819.) Later William built a larger log house, trimmed with birch bark, which Alice remembered as having "three rooms with attic on the north side of the roadway opposite the present house."

In 1807, evidently, Francis spent the winter with him. I speculate that this was William's first winter on the frontier, and he wanted someone with him in case he cut his foot on an ax

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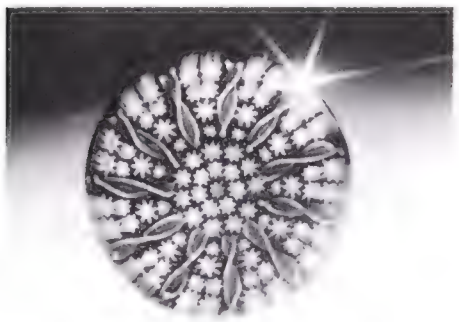

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or got lost in a blizzard or something.

One winter he nearly did die. He had walked the 16 miles to Penn Yan for a good hearty tavern dinner, but on the way back he was overtaken by a snowstorm. Trudging through unbroken drifts at night, blinded by the swirling snow, finally exhausted, he grew profoundly drowsy and was barely able to force himself to keep going to an abandoned cabin he had seen on the way over.

He fell against the door, breaking it down as he dropped unconscious to the ground. When he awoke, his arms and legs were half-frozen and took hours to thaw out. He lost his fingernails, and figured he was lucky at that.

Amazingly, there was a post office: at Bath, 16 miles away. William walked the round trip every month, once encountering a large gray wolf. The wolf rushed past him on other business, somewhat to William's relief, for he carried only a knife. Another time wolves chased him in his oxcart for two miles before giving up.

And there were the bears, a constant nuisance, for they attacked the cattle and pigs. And there were the rattlesnakes, which would come into your house to sun themselves on the floor if you left the door open.

The woods were full of game (and the neighbors' cows, turned loose to forage with bells on them). William had a cat who regularly caught partridges and brought them home for him to share.

(It is almost impossible for me to see upstate New York as a trackless wilderness. The lovely rolling country where I grew up, the Mohawk Valley around Utica, and the Cherry Valley to the east and the Finger Lakes country to the west, is a rich land of counterpane dotted with farms and hamlets, with here and there a dramatic stand of elms or maples on a hilltop, a flurry of second growth along the creek beds in the valleys, the orderly pine forests like Rogers' Woods near our farm, a compact woods of which I once made a map,

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pace-and-compass-style, that covered one whole wall of my bedroom. But even in my own time the landscape has been transformed. Bristol Road is now a highway with interchanges, known only by its number to the present inhabitants. Our orchard and pasture, part of the 40 acres that came with the magnificent Revolutionary-era house for $7,000 in 1935, are now a housing development, split-level "ranchettes" on cul-de-sacs. The great elm, famous for miles around, is long since cut down and paved over.)

Gradually other settlers moved in, many of them living around Crooked Lake, now Lake Keuka. The William Stubbs family was among them. And they had a daughter.

William married Rosanna Maria Stubbs on May 31, 1812, at the Knox farm in the village of Wayne. She was 23, born in Dublin, "a person of clear mind, very self-reliant, and a happy disposition . . . a devotee of her church, utterly fearless of physical harm," and well educated. Here she was of immeasurable help to William, who because of the political climate in Ireland, a spate of anti-Catholic measures, had little schooling.

But he certainly had enough to become a citizen. Records at Archives show that he was naturalized December 23, 1802. He cast his first vote for Thomas Jefferson, presumably the second term in 1804, and his last for Horatio Seymour in 1868.

By the time William married, the settlement had grown considerably. He spoke of a ball held about 1809 in Penn Yan, where he and his friend Patrick Quin had attracted attention with their stalwart good looks. There are a lot of Quins in our genealogy.

Meanwhile, the political situation with Britain was darkening. William had joined a company of light infantry in 1807 and by 1812 was serving as a major on the staff of a General McClure, though we have found no record that such a general existed. He and his neighbors saw action in the defense of Fort Niagara in 1813, and by 1825 William had risen to brigadier general.

"He was very assiduous in drilling the men," Alice wrote, "so much so that at one time he brought a company on his own farm and after the drill gave them their supper."

(Alice makes him sound like a combination of Daniel Boone and Saint Francis, good to his mother and a lifelong Democrat. Did he have no faults, then? There is a story about him and some cronies trying to row a keg of whisky across Crooked Lake. They abandoned the boat in a storm, and the whisky with it, but the wind blew the craft back to them, or so they claimed. I suspect a hilarious saga is hidden behind Alice's cool account, but whatever it was, it is gone now.)

I decided to look him up in the national census, which has been taken every decade since 1790. In the Archives I ran the 1810 census through a

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microfilm machine and was somewhat taken aback to find myself reading the original lists, written in an archaic and rather shaky hand. The names were collected by town, with little space or ceremony given to the separation of one town's roll from another's. Names were not in alphabetical order, and there were thousands.

But I found him, I think: William Kernan or Kernon, in the category of those "aged 26 to 45, single."

Quickly I ran up the 1820 census. And here he was for sure, a farmer, living in Wayne, New York, with a wife and four children. These would be Margaret Mary, born in 1813, Francis, born in 1816, Edward, born in 1818, and Jane, just born in 1820.

(A portrait of three of them and five other siblings is in the genealogy written by my cousin John Devereux Kernan. There they sit, august and white-haired—the famous white hair—dressed in bombazine or those long coats of many buttons that men wore a century ago. Margaret Mary, the firstborn, was already dead at age 31. I recognize my great-grandfather Francis, the U.S. Senator, who died in 1892. It is the same stern face that used to peer down at me from a gilt frame in the upstairs hall. I try to picture him as a 4-year-old, racing around that three-room cabin, clinging to his father's trouser leg as he stands in the doorway and answers the census taker's questions. I can't make the jump. He will always be "the Senator" to me.)

Perhaps it was the war that drew William into public life. As the first local settler he was looked up to by most, and apparently the opening of the Erie Canal made him distinctly prosperous, for he raised, as well as wheat, Arabian horses, Berkshire pigs and Merino sheep. He became a local school commissioner and justice of the peace, an ad hoc lawyer who settled boundary disputes and drew up contracts for his neighbors. Later he would tease his lawyer sons with the fact that not one of his decisions ever was appealed. Elected to the State Legislature in 1833 and a member of the state constitutional convention of 1846, he declined nomination for state senator in 1855 and two years later moved to Utica, where some of his children had already settled and his sons had established their offices.

He died in Utica in 1870, eight years after Rosanna. They rest together in St. Agnes' Cemetery.

I wonder: In the end, did he lose his brogue and speak in the flat upstate twang? Did he think about Ireland, about going back some day to find the priest who tutored him in secret ("under the hedge," as they say)? Did he realize that in one bumper year, 1851, the tiny island of Ireland sent nearly a quarter-million people to these shores?

And did he ever dream that his seed, the descendants of one man, would scatter, now to the seventh generation and beyond, would make a list 15 pages long, with not only 134 Kernans and their spouses but also Butlers, Constables, Devereux, Dutras, Farleys, Hutchinsons, Pattens, Roggemanns, Sévignys, Slingluffs, Sloanes, Vandervoorts, Waechtlers, Wigglesworths and many others? Could he have imagined that or anything remotely like it as he scrambled off the grocer's little boat and hurried onto the hard streets of Manhattan, looking for the sign that said, "Boy Wanted"? Did he think he was going to help build a nation or something?

William's children, white-haired and stern as they posed a century ago, had probably raced around his three-room cabin as they played their youthful games.

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Book reviews

Eminent Victorians
A. N. Wilson
Norton, $25

When Lytton Strachey published his *Eminent Victorians* in 1918, he meant to deflate and even ridicule the pomposity of his virtuous biographical subjects. Now, in an age that cherishes the Victorian in art, craft and architecture, A. N. Wilson has a very different purpose in mind: to celebrate the lives of some men and women who were, Wilson believes, justifiably eminent in their own time and still deserving of respect in ours.

His choices, not as quirky as he might

Cardinal Newman, fragile and wispy at 80, was an exceedingly eminent Victorian.

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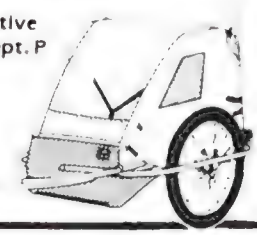

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have us believe, reflect the current intellectual climate that requires biographers to demonstrate their sensitivity about gender and social issues. Unlike Strachey, who included only one woman (Florence Nightingale) to balance three men, Wilson features three strong-willed women: Charlotte Brontë, who emerges here as no less than a literary genius; Josephine Butler, a social reformer who worked tirelessly to prevent women and children from succumbing to prostitution; and Julia Margaret Cameron, whose photographic images have defined the Victorian Age for many 20th-century viewers. His men include William Ewart Gladstone, Victoria's contentious prime minister; theologian John Henry Newman; and the endearing Prince Albert.

Readers are likely to have their own Victorian favorites—John Ruskin or Thomas Carlyle, Charles Dickens or the queen herself. But Wilson's succinct, lively portraits persuade us, in the end, of the wisdom of his selections. "When I think of Victorian England," he writes in his essay on Gladstone, "I think of energy: irrepressible physical energy, intellectual, industrial, moral energy." Surely each of his subjects exudes energy, but that is not the only criterion for their inclusion here.

More important, they struggled to define their roles in their own society, often coming into violent conflict with a world that preferred their silent acquiescence. They were deeply reflective men and women, questioning themselves and their motivations, worrying over the contradictions they perceived in themselves, and even, in the case of Gladstone, resorting to physical self-flagellation.

The portrait of Prince Albert is perhaps the weakest of the lot. Wilson tries valiantly to make Albert seem outstanding, but there is little even so talented a biographer can do with a man whose "strongest passion . . . was a passion for respectability." It was Albert who gave the English Christmas "some of its more distinctive features." It was Albert who transformed royal residences into nostalgic re-creations of his childhood homes in Germany. Albert seems to have been thoroughly warmhearted and took deep pleasure in his family; it is no wonder that Victoria loved him so well. But eminent? Not when compared with the likes of William Ewart Gladstone or John Henry Newman.

Cardinal Newman's portrait reflects Wilson's long engagement with the theologian who regained dignity for the Roman Catholic Church in England. Wilson admires Newman, even as he recognizes the difficulties in Newman's arguments and personality. Still, Newman allowed his life to be guided by grand, persistent and compelling questions about morality and religion. "John Henry Newman was no more able than anyone else to give us infallible answers to such questions," Wilson writes. Nevertheless, "for anyone who finds it impossible, quite, to put such questions out of their mind, Newman will always be a giant, and a hero."

Josephine Butler would emerge as a giant, too, even without Wilson's determined effort to fashion her into a feminist. Her concern about prostitution was generated from deeply held religious beliefs rather than from any political or social analysis of women's place in society. "The overtly religious tenor of her utterances, and her motiva-

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tion," Wilson rightly notes, "is possibly one of the things which enabled Josephine Butler's name to sink into some obscurity after the early years of this century, when other feminist heroines could be less embarrassingly quoted."

If there is a thread that binds these men and women together, it is their unwavering moral commitment and their certainty that they, and they alone, could change their world. "God and one woman make a majority," Josephine Butler once said. She might have spoken for any of Wilson's other subjects.

Wilson observes of Butler that she, among others, "made the century" but also "helped to unmake it, because it did not deserve to be." *Eminent Victorians,* lovingly illustrated, guides us through a remarkable era and helps us to understand its transformation into the modern world.

Linda Simon
Director of the Writing Center,
Harvard University

The Pencil: A History of Design and Circumstance
Henry Petroski
Alfred A. Knopf, $25

Henry Petroski's book is an unusually handsome item: taller and narrower than a standard hardback, larded with illustrations, dressed in a classy typeface, sturdily bound, and wrapped in a dazzling jacket. One looks in vain, however, for the Note on the Type, complete with book-design credits, that customarily occupies the last page of a Knopf product—surprising, given that *The Pencil* is all about design.

In the author's view, the lowly, taken-for-granted pencil can serve as a paradigm of engineering evolution. As a professor of civil engineering at Duke University, Petroski is in a position to make good on that claim. "The very commonness of the pencil," he writes, "the characteristic of it that renders it all but invisible and seemingly valueless, is really the first feature of successful engineering. Good engineering blends into the environment, becomes a part of society and culture so naturally that a special effort is required to notice it."

The word "pencil," from the Latin for "little tail," comes from the resemblance of primordial versions—styluses with lead or silver points—to brushes (whose fibers came from and reminded people of tails). The first modern pencil did not appear until plumbago (locally

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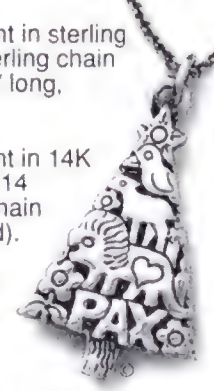

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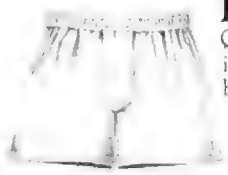

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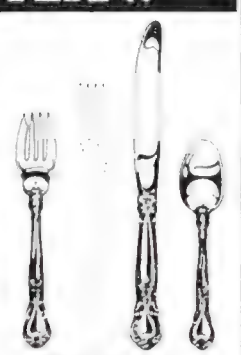

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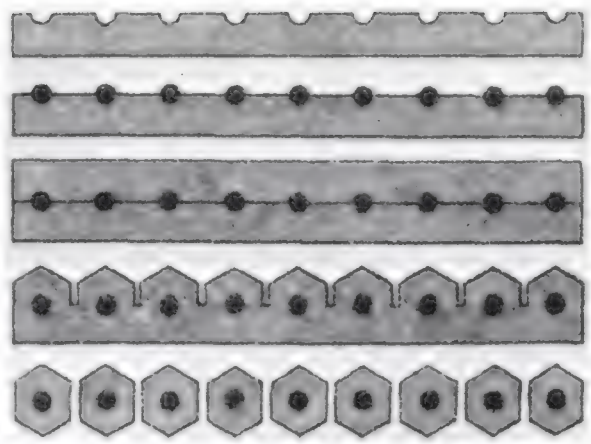
known as "wadd" and nowadays called "graphite") was discovered, in 16th-century England, at a single Cumberland deposit. Until the mine's depletion some 300 years later, English pencils set the world standard.

Along with other Europeans, the French became accustomed to plying their blank pages with English plumbago (literally "acting like lead," a reference to the substance it replaced in pencils). When the supply was cut off as a war measure during the Napoleonic era, a Frenchman named Nicolas-Jacques Conté set out to produce an alternative. Possessed of a laboratory and the patience to experiment, he reasoned from his familiarity with the properties of certain substances as to their likely usefulness as pencil stuff—and found a workable combination of graphite dust and clay. He succeeded not by serendipity, as had the Englishmen who stumbled on a mine of marking material, but by applying the scientific method.

The French were now in a position to take over world pencil leadership, but in short order so were the Germans and the Americans. Conté's process became common knowledge, and pencil making expanded into a transatlantic industry. In Massachusetts, the Thoreau family manufactured pencils, the best in the country, until competition prompted a reassessment of its position. Rather than build a larger plant to take advantage of economies of scale, the firm retrenched, limiting itself to the processing of graphite after 1853.



Nine hexagons can be cut from wood required to produce eight round pencils.

The contemporary pencil may combine materials that come from all over the world. The lead might be a "mixture of two kinds of graphite, from Sri Lanka and Mexico, clay from Mississippi, gums from the Orient, and water from Pennsylvania." The case might be made of "cedar from California, the ferrule possibly of brass or aluminum from the American West, and the eraser perhaps of a mixture of South American rubber and Italian pumice stone."

The core intrigue of pencil making—How do they get the lead inside the wood?—turns out to have an obvious-after-the-fact answer. The wooden receptacle is readied first, or, rather, half of it is: a cedar slat with grooves cut for the insertion of leads. After the leads are in place, a similarly grooved piece is glued on top. Machine tools cut the assembly into discrete hexagonal shapes, and the raw pencils are detached and painted to look seamless.

Petroski makes all this clear in a style sprinkled with puns and enlivened by industry jargon: for example, the lumbermen who drive around the West looking for pencil-worthy trees are known as "cedar cruisers." He also provides a hearty supply of pencil lore.

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One learns that the preferred yellow hue on pencil casings has to do with the discovery of a great deposit of high-quality Siberian graphite. Consumers associated yellow with the Far East, and the Koh-I-Noor was advertised as the "original yellow pencil." Other manufacturers gave their models names like Mongol and Mikado to evoke a similar Oriental panache.

The Pencil is not without its, well, leaden moments. Professorially, Petroski tends to bog down his information in directions, transitions and summaries. You'll know these parts of the book when you see them. Skim them if you please, but be ready to mark—with a pencil, of course—scores of passages where he transforms the measly pencil into a metaphor for the age of industry.

Dennis Drabelle
Washington writer and reviewer

The Adventures of
Captain Alonso de Contreras:
A 17th Century Journey
Translated by Philip Dallas
Paragon House, $19.95

The 17th century has just begun. William Shakespeare is putting on his plays in the Globe Theatre, London; Queen Elizabeth is trying to colonize Virginia; Velázquez is painting his masterpieces; and Cervantes is writing about a man from La Mancha. Spanish power is at its peak, and the Turkish empire rims the Mediterranean. It is a time of unending war between Islam and Christendom, and high-seas piracy is national policy for many countries.

Onto this world stage steps one Alonso de Contreras, a poor, underage youth of Madrid marching with a troop of Spanish infantry to Flanders. Many adventures will befall him. He will become by turns a swashbuckling sailor, a soldier of fortune, a Knight of Malta. When he grows old (50 years) he will write his life story. The manuscript will be lost, only to surface three and a half centuries later and appear finally as a handsome book, translated and annotated by former British naval officer Philip Dallas. Ostensibly an autobiography, it reads more like a fanciful picaresque. And there's the fun.

Alonso never reaches Flanders, on this trip anyway. He runs into his first adventure during the march, follows his troop leader in deserting, then joins the navy, where he quickly gets rich on booty from Turkish ships in the Levant

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and on the Barbary Coast, and just as quickly gets poor again, in the age-old way of sailors. When a bit of drunken swordplay in a tavern leads to murder, Alonso and his companions go into hiding. After yet another death, two of the malefactors are hanged, but Alonso escapes on a galleon bound for Malta.

A good many Burt Lancaster-Errol Flynn-type sea battles take place on these and subsequent voyages, all described in an endearing, understated style. "The battle was big and bloody. We could not relax a moment." Contreras is not after the Holy Grail here, nor is he burdened with high moral purpose. Continuing to experience difficulties of career and money, given to fits of temper and cruelty, he stabs his paramour's partner when he finds them in bed together, kills his wife and her lover for the same offense, slashes a woman's behind with his dagger for her gossiping against him. He is arrested frequently but always manages to escape, obviously taking to heart the old Spanish proverb, "It is safer to hide in the woods than to trust in the prayers of good men."

All is not profligacy and heavy-handedness with our spirited buccaneer, however. In his spare time aboard ship he haunts the chart house and learns navigation so expertly that by the time he is 20 he has been promoted to a captaincy and given command of a frigate. His orders read that he is to sail Levantine waters and spy on the Turkish fleet, sacking their ships when he can. He does well and gains renown, though at no small expense to his humility. "At that time I was a handsome and colorful young man," he writes, "and many people were jealous of me." Oh, to be young and a captain!

Remember when Alonso killed his wife and her lover in their bed of shame? Unaccountably, he escaped punishment for that crime, but to ease his conscience he resolves to become a hermit and serve God. "I bought the things a hermit needs," he tells his diary, "such as a hair shirt, a whip of chains, and other scourges . . . some seeds, and a little hoe."

Apparently, young blood was as hot 380 years ago as it is today, and Alonso's penitence lasts but seven months. Besides, there is a question of a cache of muskets he is accused of failing to report. Arrested, taken to Madrid, he is put on the rack, stretched a little and released. Eventually, Alonso is assigned to a galleon sailing with the fleet for Puerto Rico. Arriving offshore he gets into a skirmish with Sir Walter Raleigh. The affair is a draw: Sir Walter returns to England where he is hanged as a pirate; Alonso returns to Spain where he is ordered to defend Gibraltar.

Unfortunately, while attacking an approaching Dutch fleet, our Captain Courageous disables the Spanish flagship with an errant cannon shot, whereupon the battle is lost. Soon he is appointed governor of a tiny island in the middle of the Mediterranean Sea.

Reads like something from Byron, doesn't it? Or from one of my boyhood favorites, *Frank on the Gunboat.*

Paradoxically, Contreras was more than a clownish musketeer. He was a friend and houseguest of the famous playwright Lope de Vega. He enjoyed several audiences with the Spanish king and, at age 48, one audience in Rome with Pope Urban VIII, who provided

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him with briefs exempting him from "legalities of residence and service" and commanding the Order of St. John to receive him as a Knight of Malta, an honor previously bestowed only on those of noble blood. "By reason of his great prowess and fine deeds," the manifesto reads, "Captain Contreras is armed knight."

Perhaps it's best that we leave our aging Spanish Rambo at this juncture, basking in his honors and finishing his memoirs after 11 days of steady writing. He modestly suggests that in his hurry he may have left out a few adventures.

Do you believe that?

William Dieter
Denver novelist

Vincent Van Gogh
Vol. 1: *Paintings* by Evert van Uitert, Louis van Tilborgh, Sjaar van Heugten
Vol. 2: *Drawings* by Johannes van der Wolk, Ronald Pickvance, E.B.F. Pey
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In today's dizzying world of art superstars and auction blockbusters it isn't necessary to know anything about art to know all there is to know about Vincent van Gogh; the prices, the pathos, the heart-beating paintings, the powerful, skeletal drawings. So it seems.

For their maker it is all too late. The acclaim would have made him miserable, you can be sure, judging by his reaction to the one Parisian art critic who wrote approvingly of his work. He begged the writer to desist. He was unworthy of attention. The idea made him nervous. To be nervous brought with it the fear of breakdown, of fright and horror.

He could have used a little money. It would have been heavensent to have, without begging letters, a few francs for canvas and paint. It was that basic throughout the ten short years that were the full length of his painting career; from age 27 to death a decade later, in isolation, by his own hand, an entire treasure of paintings and drawings left behind, never to know how they were destined to be admired and bartered in electronic auction houses, subject of world headlines.

Van Gogh has become to art history what Venice was to Henry James, a glorious place so much written about that there was, James submitted, nothing left to say as he proceeded to write one of his insightful, intimate and enlightening essays. No James has yet appeared on the subject of Van Gogh, although a vast

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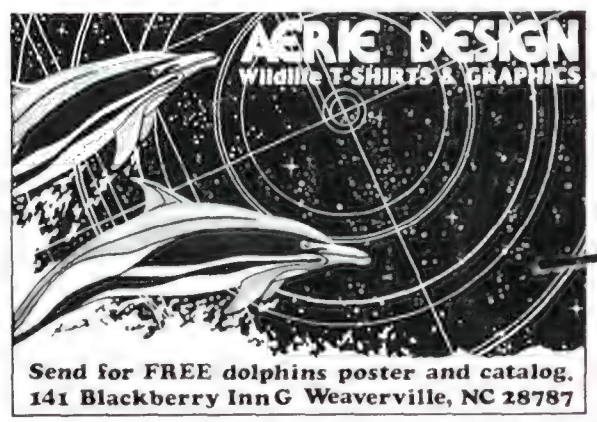

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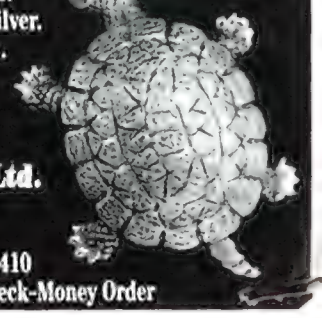

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library has been published, some of it excellent, a good deal of it ordinary.

One thing is certain however, which is that nothing ever written, or ever likely to be written, about the man will tell more about him and his work, almost painting by painting, than his letters, a superb work of literature, a mental anatomy of a creative genius, which for insight and drama can be compared to the work of the world's great novelists.

Now, take these beautifully produced and scholastically impeccable new volumes, add them to a good, complete edition of the letters and you have both the essence and the glory of Van Gogh, be you student or scholar. Together they can provide you with all you need or want to know about the artist.

These volumes, one devoted to paintings, the other to drawings, are the catalogs of the exhibitions marking the Netherlands' centennial commemoration of Van Gogh's death, on July 29, 1890. The observance was one of the remarkable cultural events of the 20th century.

In format the books are a good size for handling, 12 by 9½ inches, sturdily bound and spaciously laid out on the page, printed on thick stock and very carefully attentive to color reproduction—an expensive, difficult and often badly accomplished task. They are a pleasure to hold, to look at and to learn from.

The notes that accompany each painting and drawing are lucid, researched by scholars and vastly informative, ranging from comments from Van Gogh's letters as he conceived a painting to his thoughts on it as he went along. This, with the information so concisely provided by experts, can give you as intimate an introduction to Van Gogh's work as you could hope for.

Picasso, one of the wealthiest and most acclaimed artists of all time, who in his old age came to revere Van Gogh's work, had himself driven from his home on the Côte d'Azur the four hours or so to Arles, where Van Gogh painted one masterpiece after another in a tormented 18 months before he broke down and consigned himself to a mental asylum. Picasso stepped out of his Rolls-Royce and, reflecting no doubt on his own eminence and Van Gogh's pitiful existence, asked, What would Van Gogh have thought of all this? Picasso wondered and so do we.

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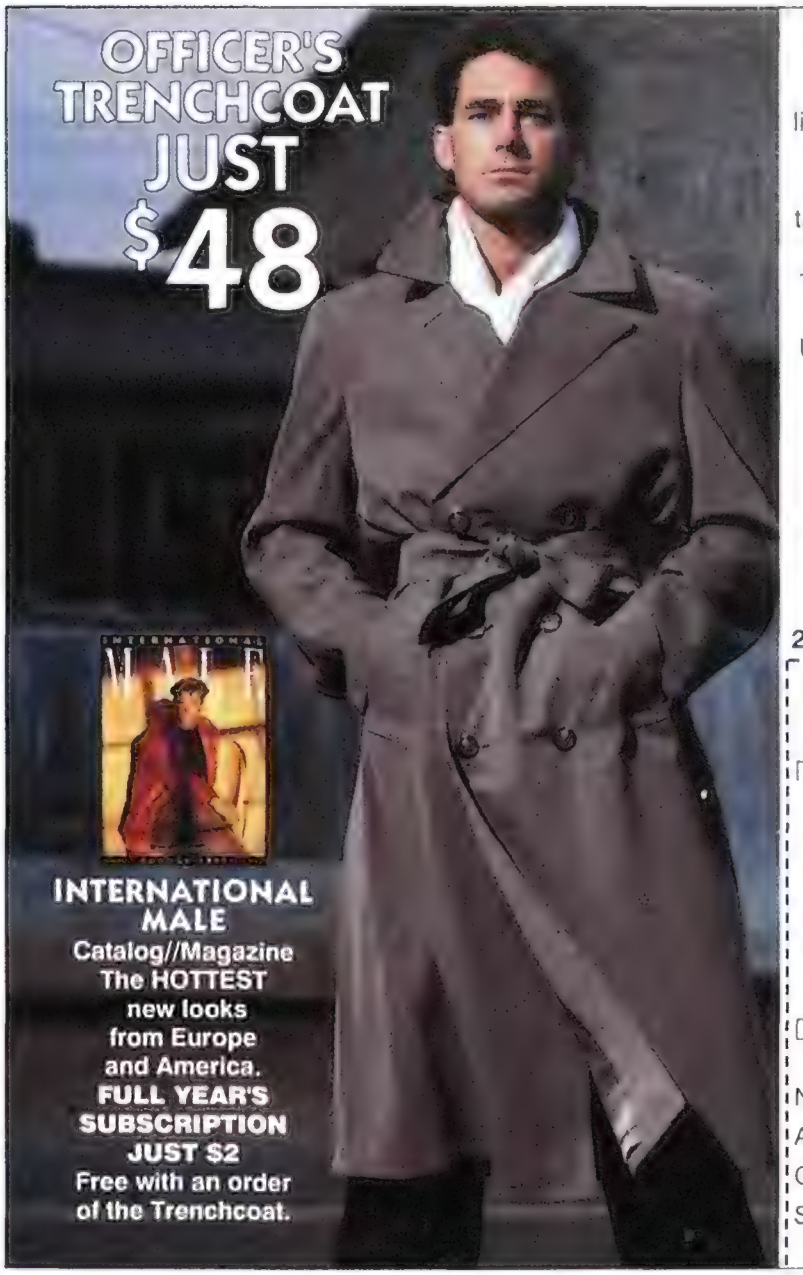

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The Court in the National Museum of Natural History will be closed on Wednesday, October 17.

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Made With Passion: The Hemphill Folk Art Collection (through January 21) Nearly 200 works from one of NMAA's most significant acquisitions. See *Highlights continued*, page 215.

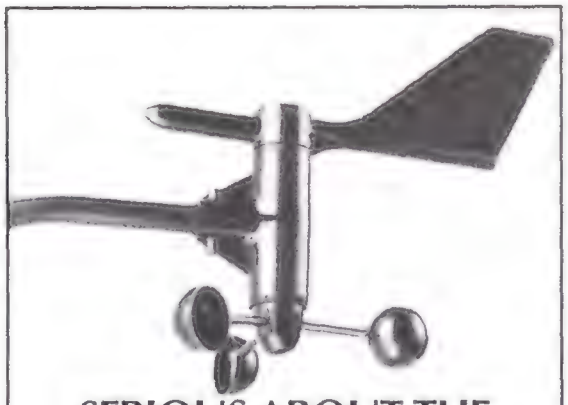
Childe Hassam: An Island Garden Revisited (October 5-January 6) Images of the Isles of Shoal, New Hampshire, by America's foremost Impressionist.

Visual Poetry: The Drawings of Joseph Stella (through November 12) Sixty of the painter's drawings and collages.

National Museum of Natural History

Shark! Fact and Fantasy (October 26-January 20) Comprehensive look at sharks and their behavior.

North American Wildflowers (runs indefinitely) A commemorative exhibit



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honoring painter Mary Vaux Walcott.
A Jeweler's Art: Masterpieces from Van Cleef & Arpels (through November 30) The famed company's creations, 1920s through '50s.
Life in the Ancient Seas A major new installation, featuring a diorama of a 230-million-year-old reef.

Renwick Gallery
Structure and Surface: Beads in Contemporary American Art (through November 25) Creations by 12 artisans.
Four Contemporary Calligraphers (through January 1) English, Chinese, Arabic and Hebrew manuscripts.

Arthur M. Sackler Gallery
Antoin Sevruguin: Photographs of Iran (through May 26) Stunning images of life in Iran, 1880s through 1920s.
Chinese Lacquered Furniture (October 14-April 30) Pieces from the 15th through the 18th centuries.

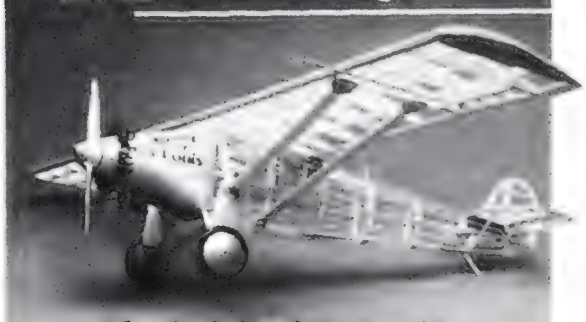
Cooper-Hewitt Museum (New York)
Gold of Greece: Jewelry and Ornaments from the Benaki Museum (through January 13) More than 200 objects from the Athens museum.

National Museum of American History
Carry Me Home: Photographs by Debbie Caffery (October 17-December 30) A look at Louisiana's sugarcane culture.
This is your Childhood, Charlie Brown: Children in American Culture, 1945-1970 (late October-April 30) Post-World War II children, as depicted in Charles Schulz's *Peanuts* comic strip.
Contrasts: Forty Years of Change and Continuity in Puerto Rico, Photographs by Jack Delano/Contrasts: Fotografias de Jack Delano (through October 15) A bilingual SITES exhibition showcasing works of the distinguished photographer.

National Museum of African Art
Royal Benin Art Creations from court artisans, 15th through 19th centuries.
Permanent Collection More than 100 masterworks from sub-Saharan Africa.

National Portrait Gallery
The Five of Hearts (through November 4) Portraits of a 19th-century circle of friends, including Henry Adams.
Working for Time: The Covers of Robert Vickrey (through November 4) Portraits of subjects from Nelson Rockefeller to John Updike.
Oliphant's Presidents (through November 25) Satiric political sketches.

Build a Memory



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John Baldessari (October 17-January 6) The first major retrospective on the influential Los Angeles artist's work.
DIRECTIONS: Boyd Webb (October 31-January 27) Photographs by the London-based artist.
David Ireland: WORKS (through November 4) An installation by the San Francisco artist.

National Air and Space Museum
Trust But Verify / Do Veri, No Pro Veri A new permanent exhibition features a U.S. Pershing II missile and a Soviet SS-20 missile and explains the Intermediate-range Nuclear Forces (INF) Treaty between the two countries.
A Piece of Mars? (indefinite) The fragment of meteorite discovered in Antarctica and thought to be from Mars.
Drawings and Things by Rowland Emmett (through November 26) A lighthearted look at airplanes, spacecraft.

Exhibition catalogs

Catalogs available currently include:
Visual Poetry: The Drawings of Joseph Stella ($24.95, paper; $45, cloth)
Puerto Rico Mio: Four Decades of Change ($24.95, paper)
Made With Passion: The Hemphill Folk Art Collection ($29.95, paper; $50, cloth)

To order, send check or money order to Museum Shops, 3301 75th Avenue, Landover, Maryland 20785. Include 15 percent of total purchase to cover postage and handling (minimum, $1.75).

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Here at the Smithsonian: Three-minute TV spots take you behind the scenes.

To find out which stations in your area carry these programs, write: Office of Telecommunications, MAH Room BB40, Washington, D.C. 20560.
From the Smithsonian: A series of five programs, produced by the Office of Telecommunications, will air on the Learning Channel, a cable network, during October: *The Work of Peace*; *The Battle of Yorktown*; *Thomas A. Edison and His Amazing Invention Factories*; *Magnificent Voyagers: The United States Exploring Expedition,*

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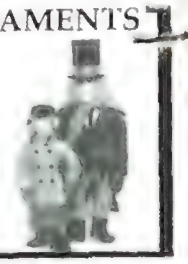
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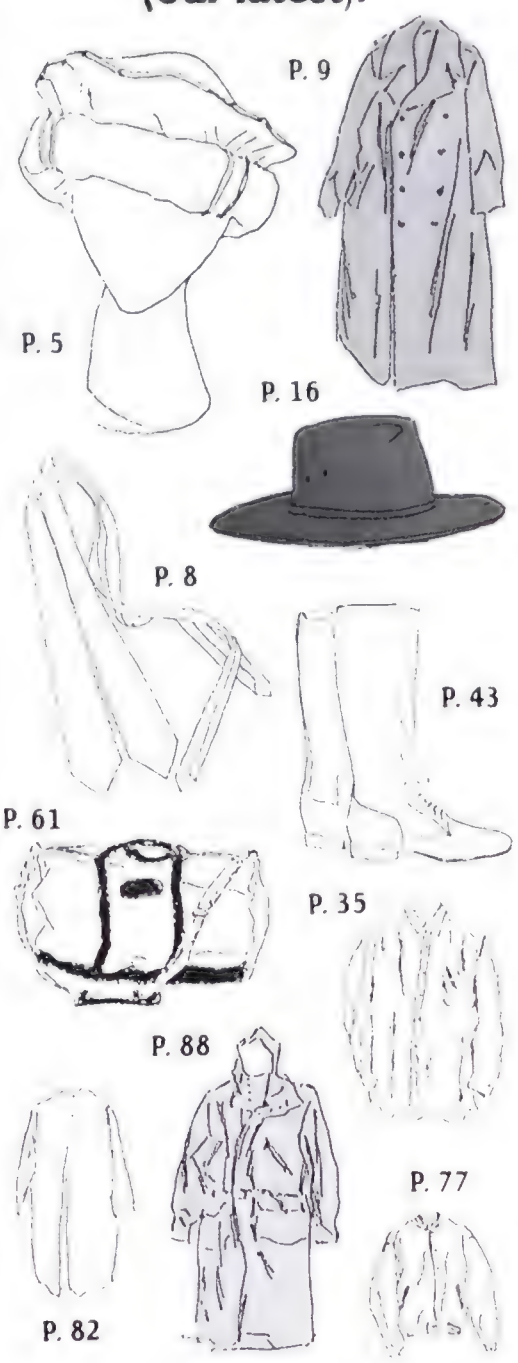

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1838-1842; and *Celebrating a Century: The 1876 Philadelphia Centennial Exhibition.* Check local listings for date, time, channel.

Invention Series: The Discovery Channel, a cable network, and the Smithsonian Institution will present a series on technologies that affect us all; it begins October 2. Each segment will feature an appearance by Roger Kennedy, director of the Smithsonian's National Museum of American History. Check local listings for date, time, channel.

Smithsonian National Associates

The Program hosts events in Casper and Cheyenne, Wyoming, October 18-21; and in Reno, Nevada, October 5-7.

For further information, write to the U.S. and International Events Program, 490 L'Enfant Plaza S.W., Suite 4210, Washington, D.C. 20560; or call (202) 287-3210.

Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call 357-3030. Here are some October events:

Tito Puente and his Latin Jazz Ensemble (October 28; 7:30 P.M.) The king of Latin jazz in a special concert.

An Evening with Richard Leakey and Conservation (October 13; 8 P.M.) Kenya's Director of Wildlife on the fight to save East Africa's wildlife from poachers and habitat destruction.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560.

Here are some October exhibits:

Alliance, Ohio (October 27-November 25) *Vietnam Veterans Memorial: A National Experience*, Rodman Public Library.

Colorado Springs, Colorado (October 13-November 11) *Black Wings: The American Black in Aviation*, United States Air Force Academy.

Pine Bluff, Arkansas (October 6-November 11) *The View from Space: American Astronaut Photography, 1962-1972*, Arkansas Arts and Science Center.

Santa Fe, New Mexico (October 6-November 18) *Spectacular Vernacular*, National Park Service.

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One collector's folk-art finds

As a child growing up in Atlantic City during the 1930s, Herbert Waide Hemphill jr. often accompanied his mother on her antique-collecting expeditions. Emma Hemphill had a passion for Dresden china and paperweights. As they haunted auction houses and shops, the inquisitive schoolboy began to carry home treasures of his own—a decoy, tin candle molds, a pencil drawing of a minstrel show.

This eye for simple, sometimes homely and offbeat beauty became the basis of a lifetime of inspired collecting. Over the years, Hemphill has enlarged, and redefined, the notion of folk art as he has amassed objects of every description.

In 1986, the National Museum of American Art acquired, through gift or purchase, 427 of his pieces, from paintings and bottlecap animals to canes, tattoo designs and whirligigs. Almost half of these holdings, now on view in their new home, form the nucleus of "Made with Passion: The Hemphill Folk Art Collection of the National Museum of American Art."

"This collection," says NMAA director Elizabeth Broun, "represents an essential part of the American visual heritage. The challenge is . . . to open our eyes and minds to all that [these objects] say about our lives. . . . Hemphill's astonishing ability to see what was invisible to so many others left him free to roam in uncharted territories of art."

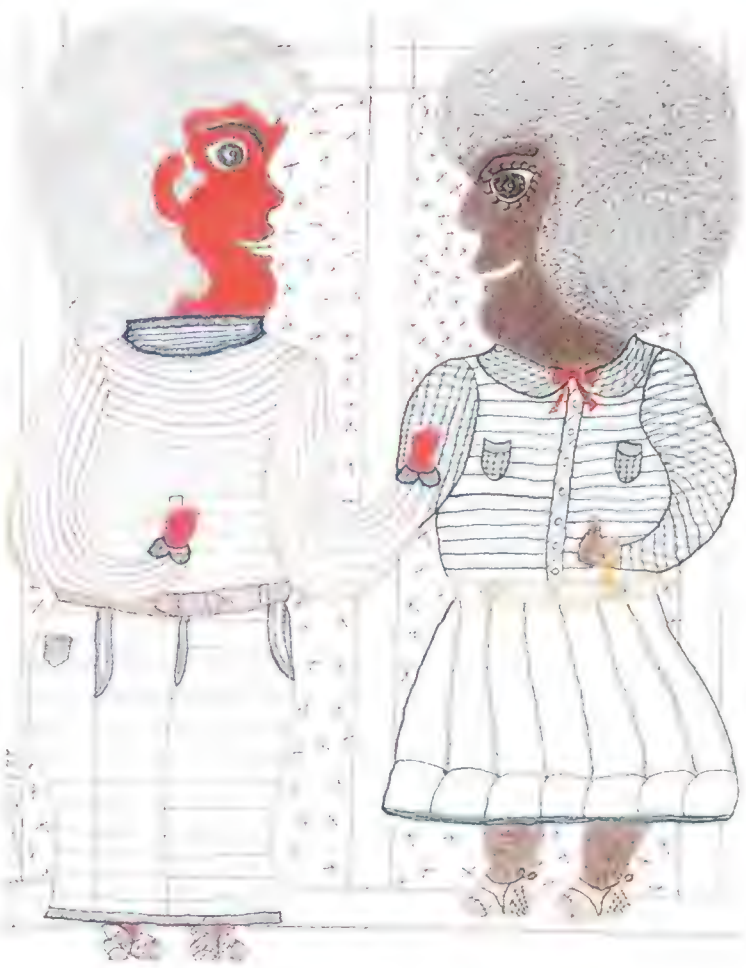
For more than three years, the museum staff has devoted a massive effort toward conserving, restoring and documenting the history of the hundreds of 19th- and 20th-century American pieces.

During that time, exhibition curator Lynda Roscoe Hartigan prepared *Made with Passion*, an engaging account of Hemphill's career and the objects, whimsical and touching, plain and fantastic, he collected. The book, published by Smithsonian Institution Press, is also an absorbing excursion through the history of folk art.

The show runs until January 21, 1991.
Kathleen M. Burke

John William (Uncle Jack) Dey's *Adam & Eve Leave Eden*, 1973, features the avenging angel handing down an eviction notice.

Leslie J. Payne of Virginia crafted painted-wood-and-metal model of a menhaden fishing fleet vessel, *Fish Boat Back In Year 1929 Run By Steam*, in the mid-1970s.



Double Portrait, 1977, by Inez Nathaniel Walker, of felt-tipped pen and ink with pencil and crayon, depicts a lively conversation between two old friends.

Continues on next page

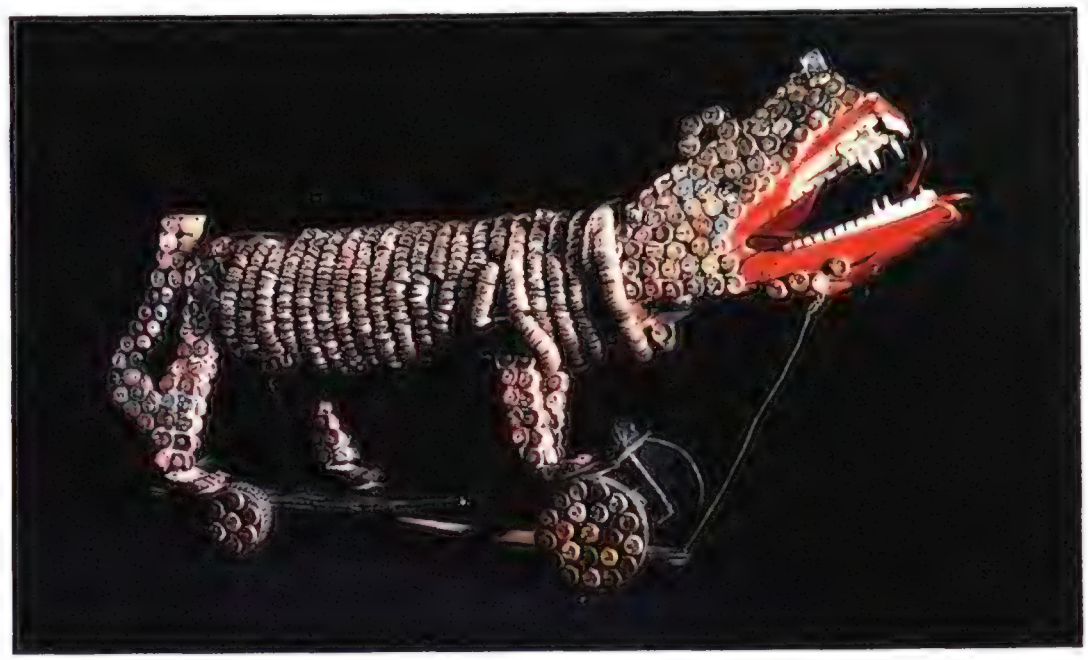
Mickey Mouse Kachina shows Disney influence on Hopi culture, post-1929.

Sculptor Clark Coe carved entire tableau of figures such as *Killingworth Image, Man on a Hog*, circa 1890, for streamside clearing on his property in Connecticut.

Howard Finster painted his portrait of Hemphill, with collections, in 1978.

Artist James Leonard did cut-copper *Wind Machine with Gabriel, Eleanor Roosevelt, and Louis Armstrong* as tribute to the First Lady, in 1984.

Bottlecap Lion, completed after 1966 by an unidentified artist, includes whimsical touches such as flashcube eyes, carved teeth.



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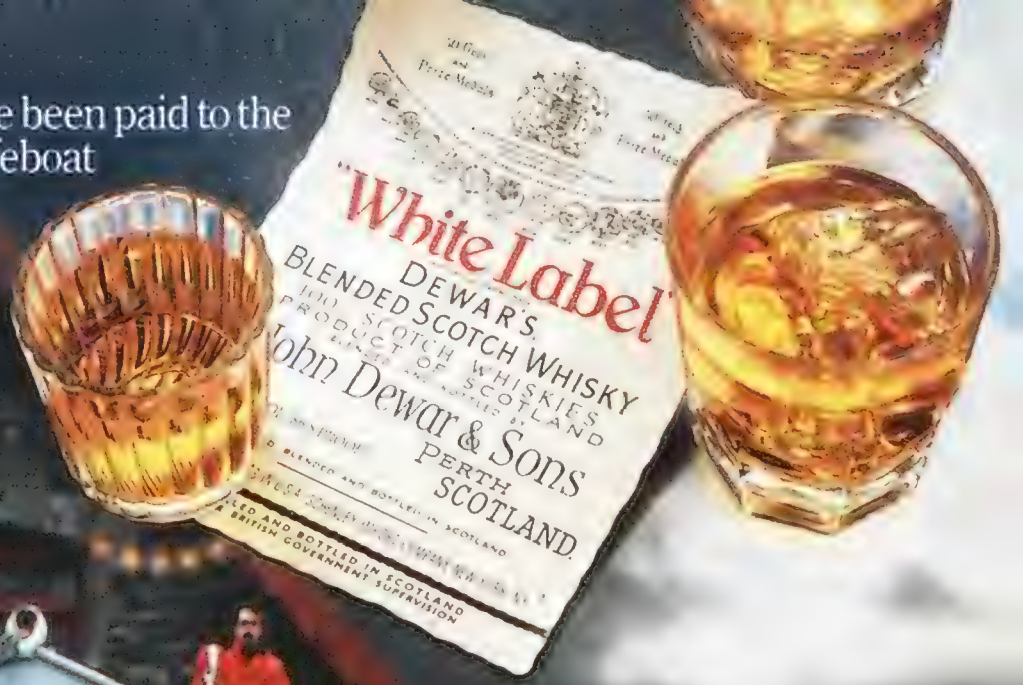

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New York City *November 15-18* European art, architecture and a Broadway show.

Christmas at the Smithsonian *December 13-16* Visit Alexandria, Virginia, the U.S. Capitol and Ford's Theater.

Christmas in Santa Fe *December 20-27*

Florida Everglades *January 22-30* Canoe the Ten Thousand Islands.

Birds of South Texas *February 16-23* Learn birding techniques at wildlife refuges.

Baja Whale Watch *February 23-March 3* Explore islands from San Diego to San Ignacio Lagoon.

Yellowstone in Winter *February 24-March 3* History, ecology and cross-country skiing.

Hawaii Camping *March 16-30* Hike the islands of Kauai, Molokai, Maui and Hawaii.

Charleston-Savannah *March 19-26* Historic homes and gardens.

Sapelo Island *March 28-April 1* Explore this Georgia barrier island.

New Orleans-Natchez *April 7-14*

Historic Homes of North Carolina *April 9-17* New Bern, Edenton, Outer Banks.

Arizona in Spring *April 10-18* From the Sonoran Desert to the Chiricahua Mountains.

Sojourn in Sedona *April 18-25* Arizona natural history and art.

Big Bend (Texas) *April 18-27*

Foreign Study Tours

Folk Art and Celebrations of Colonial Mexico *October 27-November 8*

NEW Bermuda *November 8-12 or February 21-25* Enjoy the island's cultural heritage.

Interludes *November-April* Uncrowded museums, cultural events and leisurely exploration in London, Venice, Munich, Prague, Paris, Lisbon, Vienna, Hong Kong, Kyoto.

Christmas in Europe York and Edinburgh, Canterbury or Switzerland.

South America Adventure *January 3-23* Cruise around Cape Horn on the *Seabourn Pride.*

India Wildlife *January 13-February 7*

Yucatán Adventure *January 16-28*

USSR Performing Arts *January 18-31* Includes the Bolshoi and Kirov theaters.

Kenya-Tanzania *January 24-February 10*

Far East Adventure *February 6-26* Singapore, Malaysia and Thailand.

Guatemala *February 13-25* Explore monumental Mayan ruins.

Red Sea Cruise *February 17-March 2*

Belize Cruise *February 19-March 5* Cozumel to Panama.

Indonesia Cruise *February 19-March 7*

Countryside Tours *February-September* Relaxing sojourns in Mexico, Greece, Italy, France, England, Switzerland, Austria, Wales and Germany.

NEW Reindeer Safari (Finland) *February 24-March 5*

NEW St. Kitts *February 28-March 9* Enjoy the Caribbean's Lesser Antilles.

NEW Indian Ocean Cruise *March 1-19* For Smithsonian Contributing Members.

Australia-New Zealand *March 1-21*

NEW Belize Adventure *March 2-9*

NEW Treasures of Mogul India *March 5-25*

NEW Alpine Snow Train (Switzerland) *March 7-19*

Sea of Cortés *March 13-20* Cruise Mexico's Gulf of California.

Budapest Music Festival *March 13-24*

Morocco *April 13-27*

NEW Dutch-Belgian Cruise *April 13-28*

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Costa Rica *April 18-May 3*

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NEW North Africa Cruise *April 19-May 1* Aboard the *Renaissance.*

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Gardens of Northern Italy *April 23-May 4*

Berlin, Prague and Budapest *May 1-12*

Brazil-Argentina *May 1-15*

Splendors of Italy Cruise *May 5-22* Aboard the *Argonaut.*

NEW Mozart and His World *May 8-19* Austria and Czechoslovakia.

USSR Natural History *May 17-31* Explore Black Sea and Caucasus preserves.

Treasures of Spain *May 17-June 2*

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About the Author

Psycholinguist Suzette Haden Elgin has presented her innovative self-defense principles in a variety of formats. She has given workshops and seminars all over the U.S., including verbal self-defense sessions for doctors, lawyers, and other professionals. Dr. Elgin has also created a self-defense tape and a training manual for people who teach her self-defense techniques.

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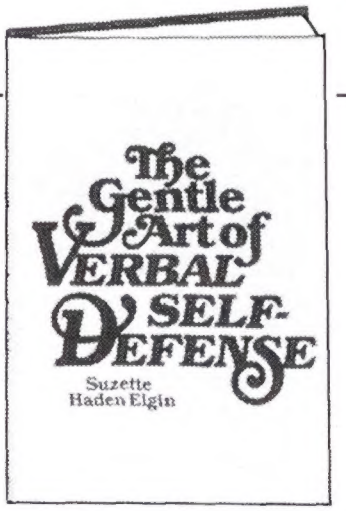


By Daniel Pinkwater

That gilded yo-yo, an elusive prize

There is a category of objects with which we are more comfortable and familiar than other things. A common yellow wooden pencil. It isn't even necessary to describe it. Every 20th-century American, if not everyone on the planet, gets a picture automatically. An apple. A ball. Examples in alphabet books. Some variation is possible. What kind of apple? What kind of ball? But certainly a vivid image occurs. From childhood. That's what defines the category. Simple objects we loved right from the beginning. Primary artifacts.

Like the bright orange yo-yo on my desk: totally familiar—friendly. The size and contours—that curious flat-sided roundness, the protruding, slightly grimy dangle of twisted string. I'm sure I haven't been near a yo-yo in 30 years, yet this could almost be a relic from my own toy box.

Until I pick it up and discover that it's not turned of hardwood, but molded of plastic. Ingeniously, it's the precise weight and heft of the old wooden ones (it appears I can remember that with certainty). Instead of glamorous gold-stamped lettering on the side, there's classy silk-screened blue "WAMC Public Radio"—a promotional gift in exchange for my donation.

I've been spinning the thing since it arrived. I can still make it "sleep." Like riding a bike, you never lose the basics. And as it whirrs at the bottom of its cord, images, clear and sharp as the aroma of Crayolas, rise up from the murky deep of memory.

The Louis B. Nettlehorst Elementary School in Chicago—built in 1893 and still doing business as of last year when I drove past. Instantly I think of the place, I think of winter. It seems to have been winter most of the time when I was in attendance.

I prickle all over at the thought of the dreaded snowsuit, a one-piece monstrosity into which one was variously buttoned, zippered, strapped and buckled. My fingers ache at the thought of the diabolical five-buckle galoshes, which to my knowledge no one on Earth has ever been able to fasten—or, more horrible—unfasten.

I still wake up screaming when I dream of unsuiting in the dim and crowded cloakroom—the smell of wet wool, the horrible sucking sounds of those galoshes coming off. It must have looked like 25 or 30 tiny Houdinis doing the straitjacket trick among the lumps of melting snow. And six or so hours later, we'd have to get back into the life-support outfits for the voyage home.

Winter at the Louis B. Nettlehorst School. So you can imagine with what gratitude spring was welcomed. As the weather went from lethal to merely bone-chilling, we would congregate before school on the playground, which was surfaced with a special sharp-edged gravel that, when one made sudden contact with it, would invariably result in honorable wounds.

Scooping away the gravel, we would expose the permafrost and create hard surfaces for the marbles and tops seasons. These came in their turn each spring. It would be marbles for a while—and then, one day, tops. Followed a few weeks later by yo-yos. The yo-yo season was the apex of the social calendar. Something like boat races on the Thames at Oxford.

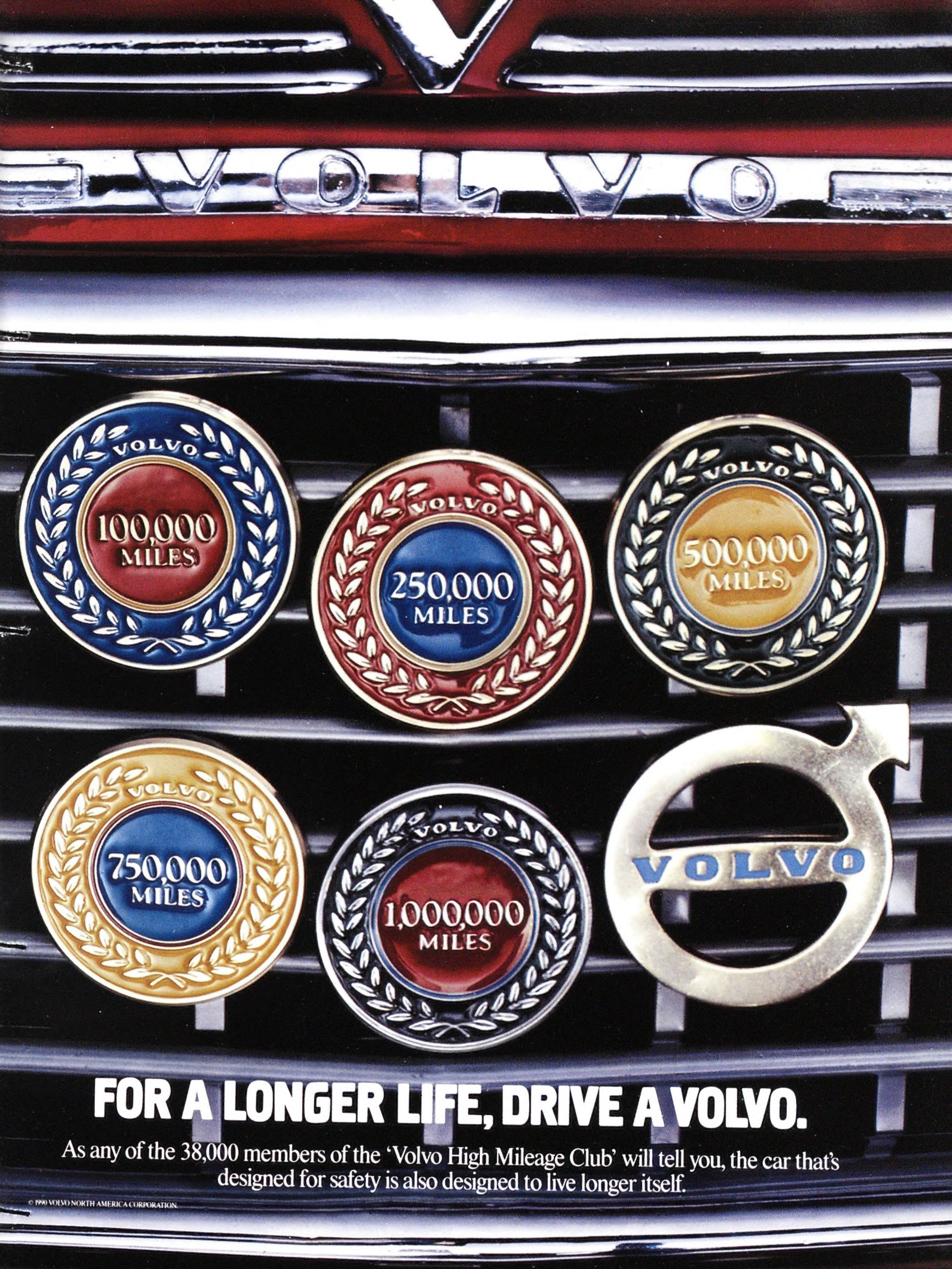
The event that gave yo-yo-ing such class was the appearance of Manuel, a Filipino guy in a gold sport jacket. The yo-yo was practically the national sport in the Philippines, and Manuel was a yo-yo virtuoso. He was just there in the schoolyard one day, doing amazing tricks with two yo-yos, then with four! It was astonishing. And he gave away little booklets—for free! They were put out by the Duncan Yo-Yo Company, and they contained instructions for doing all the tricks the guy in the cloth-of-gold jacket had done.

Of course, you had to have an Official Tournament Duncan yo-yo to get really good results. The idea was that Manuel was going to come back. He'd hold a yo-yo tourney right in our schoolyard, and the winners would receive special golden Duncan yo-yos with five rhinestones on each side. These yo-yos could not be bought in any store.

I invested in a suitable yo-yo. Deep cherry red it was, with a spritz of black paint across each side. Beautiful, and stamped in gold with the words "Official," "Tournament," "Duncan." And I practiced. I learned the basic maneuver—the sleeper. Then walk the dog. Rock the baby. Around the world. The wrist flip. The double wrist flip. I achieved technical mastery. I began to develop a style. I created a wicked variation of the double wrist flip that I combined with a half-arc. I was good. I knew it. The golden rhinestone yo-yo would be mine.

Except the guy in the sport jacket never came back. Summer passed. Autumn flashed by. The desolate winter returned. Snowsuits. Five-buckle galoshes. Darkness and biting wind. Spring. Marbles. Tops. Then—scores of kids with newly strung Official Duncan Tournament yo-yos and foxed and dog-eared yo-yo manuals. But no Manuel.

The next year he did not come. Nor the next. I kept in practice. I stayed ready. I still had that yo-yo book with me when I went to college. I guess I was 22 when I realized that Manuel was never going to turn up—and that this is a false world. And yet, if called, maybe with a week or two of practice, I think I might still have a shot at the sparkling, spinning, golden prize.



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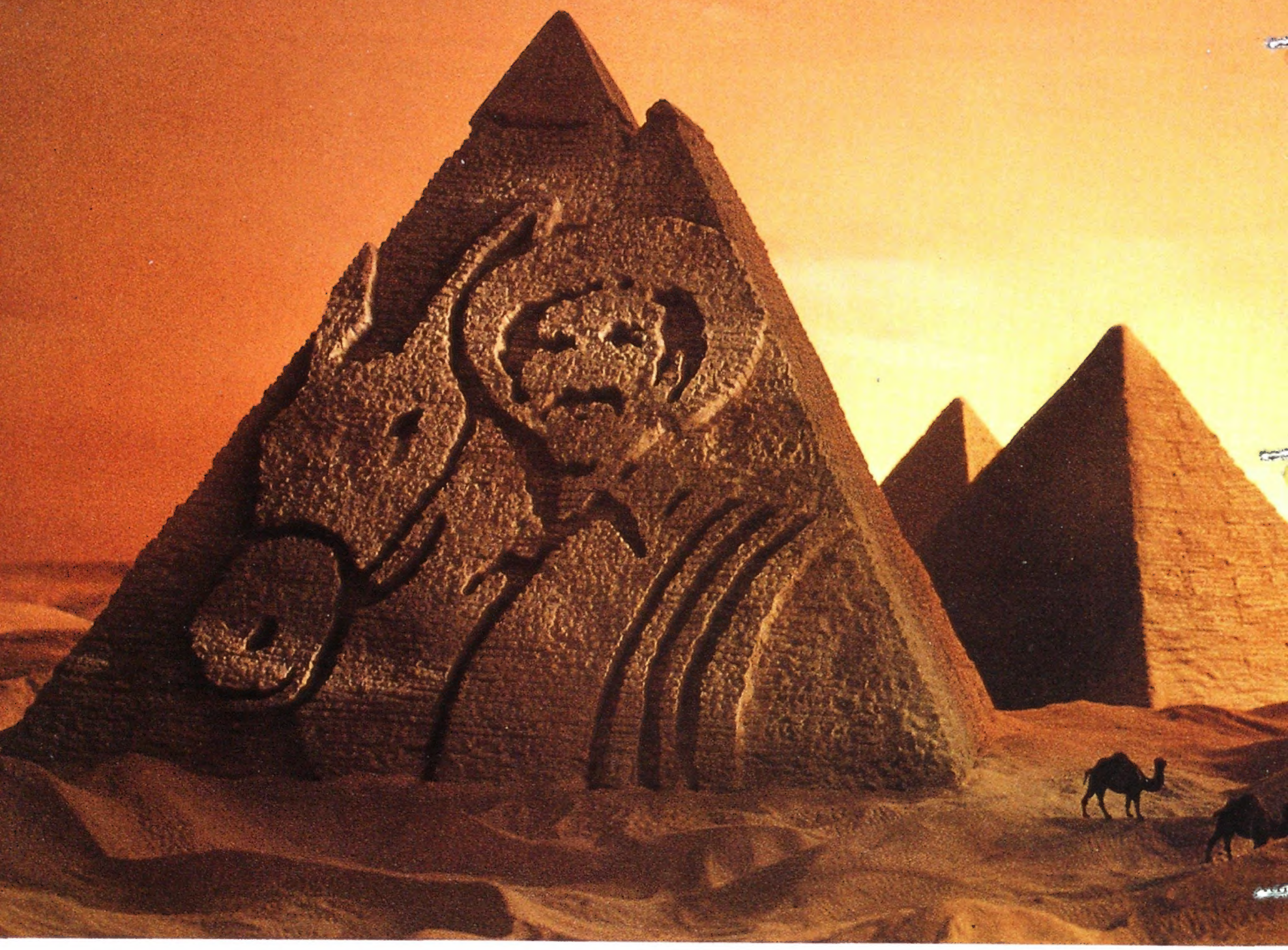

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